Curriculum Committee

Thursday, October 3, 2013 4:30 PM
Curriculum Committee, L.P. Wilson Community Center, Room 17, 601 Matianuck Avenue, Windsor, CT 06095

1. **Call to Order, Pledge of Allegiance, Moment of Silence**
2. **Audience to Visitors**
3. **Spanish Conversation and Culture Part 2 Curriculum**
4. **Astronomy Curriculum**
5. **Integrated Science and AP Biology Articulation**
6. **Microbiology Curriculum**
7. **Grade 5 Language Arts Curriculum**
8. **Adjournment**

Windsor Public Schools
Curriculum Map
Spanish Conversation and Culture: 9th – 10th

Purpose of the Course:

Through world language study, students develop sensitivity to the cultural and linguistic heritage of other groups and their influence on our own, and are prepared to participate in a society characterized by linguistic and cultural diversity.

The goal of the World Language program at WHS is to expose students to a different language and culture in order to make them knowledgeable and active members of a global society. Students will learn to use modern world languages for meaningful communication in both spoken and written form. This Conversational Spanish course emphasizes language as it is used in various real-life situations that students are most likely to encounter. As the world moves towards a global community, it is increasingly important to be able to communicate in languages other than English. It is important to understand the perspectives of a culture that generate its patterns of behavior, ways of life, world views and contributions.

Name of the Unit: 5 Music in the Hispanic World	Length of the unit: 9-10 blocks (86 minutes)

Purpose of the Unit:

Students learn about music in the Hispanic World and its relationship to different cultural groups. Students will learn how music differs by region and is influenced by historical events. Students will able to make conclusions about songs and where they are from after listening to them and identifying the genre and instruments.

ACTFL Standards

- 1.3 Students present information, concepts and ideas to an audience of listener or readers on a variety of topics
- 2.1 Students demonstrate an understanding of the relationship between the practices and perspectives of the culture studied
- 2.2 Students demonstrate an understanding of the relationship between the products and perspectives of the culture studied
- 3.1 Students reinforce and further their knowledge of other disciplines through the foreign language
- 3.2 Students acquire information and recognize the distinctive viewpoints that are only available through the foreign language and its cultures
- 4.2 Students demonstrate understanding of the concept of culture through comparisons of

the culture studied and their own

Big Ideas:	Essential Questions:
• Music is a universal language • All cultures have a unique form of musical expression	• Why does music differ from country to country? • How do new forms of music evolve? • What can I learn about my own culture from the study of music?
Students will know:	Students will be able to:
• A variety of Hispanic music genres • Vocabulary related to music and musical instruments in Spanish.	• Use technology as a tool to research, and evaluate information on Hispanic Music • Demonstrate knowledge of music genres and identify key aspects of that genre when they are provided with an audio clip • Discuss and compare similarities, differences and influences of various Hispanic music types • Create and present a technology based product on a Hispanic artist of their choice including information such as genre, instrument, origin, history, and influence

Significant task 1

During this chapter, students are learning about music in the Hispanic world and how it has influenced the US and other countries. Students have learned typical Spanish instruments that are important to each genre and have had opportunities to listen to songs with those instruments so that they identify the sounds of the instruments in the Hispanic songs.

In pairs students will create a physical product (poster, presentation box, pamphlet, book, etc.) to represent their understanding of Hispanic music in the United States. Students will initially select three different genres of Hispanic Music from http://www.pbs.org/wgbh/latinmusicusa/#/en/exp/bolero/universe. They will explore those genres and choose one to present to the class. Their presentation product will include songs, artists, instruments, origins, countries, personal opinions and reactions to this type of music.

This task directly target the following standards: **2.1** and **3.2**

Timeline: 3-4 blocks
Key vocabulary: Spanish speaking countries, musical instruments, music genres
Resources: Avancemos textbook 2 Music (Interactive Culture from Classzone) dictionaries, computers, CD from Avancemos Musica del Mundo Hispano, paper and art supplies.

Significant task 2

After students have learned about the Hispanic music and its genre, they will begin learning about famous Hispanic artists. Students will be able to read about and learn as a class about some of the most famous Hispanic artists so that the teacher is able to model what students will be expected to do in ther Hispanic artist task.
Given a list of Hispanic artists, each student will create a technology based presentation (Prezi, animoto, ebook, etc.) on a Hispanic artist. They will include audio of songs, images related to the genre, instruments, origins, and influences. Students will also include a brief narration of their reaction to the artist and type of music. In the reaction, Spanish will use the target language to express what they like and don't like about the artist and his/her music.

This task directly target the following standards: **4.2**
Timeline: 3-4 blocks
Key vocabulary: : Spanish speaking countries, musical instruments, music genres, me gusta, no me gusta and common phrases for feelings in Spanish
Resources: Avancemos textbook 2 La Musica C1-C24, and ancillary materials, dictionaries, computers and smartboard,

Common learning experiences:

- Students will participate in introductory discussions and jigsaw activities about musical genres in the US
- Students will create and present their poster post jigsaw activity on the American music and the people who listen to that music
- Power point presentation and student note-taking of musical instruments and genre in Spanish
- Memory or matching games to aid students in learning Spanish music vocabulary
- Students will watch and explore the PBS video and website Latin Music USA to learn about Hispanic Music in the US. Link: http://www.pbs.org/wgbh/latinmusicusa/#/en/hom
- Create a paper product with a partner to present a Hispanic music genre (task 1))
- Students will listen to a variety of audio clips and will attempt to identify the instruments, genre, region and historical influences of that song
- Students complete the Avancemos Interactive Activities learning about major Hispanic music genres in the Hispanic World
- Students participate in a review session of common expressions of feelings and likes and dislikes in Spanish
- Students present likes and dislikes about the music and instruments in the target language
- Students create a technology based project on a Hispanic artist that they researched

Common assessments including the end of unit summative assessment:

- Formative assessments include the identifying music genres from audio clips and recalling and producing vocabulary
- Summative assessments include vocabulary quiz and the final audio clip assessments where students listen and respond to questions regarding instruments and places of origin of the songs
- Performance assessments include research and presentation of Hispanic genre and the individual technology based product on the Hispanic artist

Teacher notes:

- Prior to class presentations, check links to PBS and class zone activities
- Prior to task 1 and 2 remind student to bring earphones since they will be using them for listening and recording activities
- Gather materials for paper product presentations
- Teacher also needs to gather materials about Hispanic artists so that he/she can model to the class the expectation for task #2.

Name of the Unit: 6 The World Cup	Length of the unit: 10-11 blocks (86 minutes)
Purpose of the Unit: Students will be learning about the World Cup and the important role of soccer in Hispanic countries and the rest of the world. Students will also compare the World Cup to an American sport.	

ACTFL Standards

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- 1.3 Students present information, concepts and ideas to an audience of listeners or readers on a variety of topics
- 2.2 Students demonstrate an understanding of the relationships between the product and perspectives of the culture studied
- 3.2 Students acquire information and recognize the distinctive viewpoints that are only available through eh foreign language and its cultures
- 4.2 Students demonstrate understanding of the concept of culture through comparisons of the cultures studied and their own

Big Ideas:	Essential Questions:
• Soccer and the World Cup bring people entertainment, concept of being fit, concept of working together, and world peace.	• How does a country prepare to host a World Cup? • How does soccer and World Cup bring people entertainment, fitness, the concept of working together and world peace?
Students will know: • The effect of hosting the World Cup • The importance to the world and the Hispanic countries that the World Cup has • The importance of soccer in Hispanic countries • Important international soccer players and the role they have in their countries	Students will be able to: • Provide information about the World Cup and its history and the importance of the World Cup in the world. • Compare and contrast soccer and the World Cup with a sport in the US. • Create and present a technology based report on a famous soccer player • Create and present a report on the upcoming World Cup Brazil 2014 and their predictions on the winning team

Significant Task 1

With a partner students will complete part of the web quest on the World Cup 2014 http://www.zunal.com/webquest.php?w=173454. Students will complete Parts A where they research the history of the World Cup in their region. Students will create a PowerPoint, Glogster,or prezi presentation of their findings and present it to the class.
This task directly target the following standards: **1.3, 2.2** and 3.2
Timeline: 3-4 blocks
Key vocabulary: soccer and World Cup vocabulary
Resources: Online web quest http://www.zunal.com/webquest.php?w=173454, chrome books, smart board.

Significant Task 2

Students will research a famous soccer player for the upcoming World Cup 2014. Students will then compare contrast this athlete to a famous basketball, baseball or football athlete. Students will create poster or flyer comparing these two . Students will present this to the class.
This task directly targets the following standards: **1.3, 2.2,** and **4.2**
Timeline: 3-4 blocks
Key vocabulary: soccer and World Cup vocabulary
Resources: Online web quest http://www.zunal.com/webquest.php?w=173454 for guiding questions from Task B, chrome notebooks, paper and art supplies

Common learning experiences:

- Students view you tube video on South Africa Word Cup and the significance of this event on the region. Links: http://www.youtube.com/watch?v=PLrQJKU6e-g; http://www.youtube.com/watch?v=vSnQbmbQ3iM;
- Students read and have a class discussion about the articles related to the World Cup and soccer(ex: http://www.sa2010.gov.za/en/organization/holy-family-school; http://www.fifa.com/aboutfifa/worldcup/index.html; http://blogs.reuters.com/soccer/2010/07/06/just-how-important-is-the-world-cup/
- Complete webquest about the World Cup 2014 and famous soccer players. Link http://www.zunal.com/webquest.php?w=173454
- Create and present a comparison of a soccer player and an American athlete
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Common assessments including the end of unit summative assessment:

- Formative assessments quiz and comprehension questions reading and you tube activities related to soccer and World Cup
- Performance assessments: creation and presentation of technology based project of the history of the World Cup in their region and creation and presentation of the compare/contrast paper product between a famous athletes.

Teacher notes:

- Teacher must check links to make sure they are still live

- New links should be added since the World Cup 2014 is closely approaching

Name of the Unit: 7 Society and social problems	Length of the unit: 4-5 blocks (86 minute blocks)
Purpose of the Unit: Students will explore social problems (crime, racism, sexism, poverty, food security/obesity, immigration, etc.) in the U.S. and in Spanish-speaking countries. They will by begin by comparing their own experiences and understandings of social issues, then expand their focus to a Spanish-speaking country of their choice.	

ACFTL Standards addressed in this unit:

- 1.1 Students engage in conversations, provide and obtain information, feelings and emotions and exchange opinions
- 1.2 Students understand and interpret written and spoken language on a variety of topics
- 1.3 Students present information, concepts and ideas to an audience of listener or readers on a variety of topics
- 2.1 Students demonstrate an understanding of the relationships between the practices and perspectives of the culture studied
- 3.1 Students reinforce and further their knowledge of other disciplines through the foreign language
- 4.2 Students demonstrate understanding of the concept of culture through comparisons of the culture studied and their own

Big Ideas: • Your personal experiences affect your beliefs • Every country experiences social issues • There is a relationship between social issues and money	Essential Questions: • What are the most common problems facing societies across the world today? • Can social problems be solved? How?
Students will know: • vocabulary for social problems • specific examples of social problems in selected Spanish-speaking countries	Students will be able to: • compare and contrast social issues in U.S. and Spanish-speaking countries • explain historical reasons for social problems in the U.S. and Spanish-speaking countries • draw conclusions about causes of social problems • suggest possible solutions for social

	issues

Significant task 1: Helping Hands
As a class, students discuss social problems affecting our school and community (i.e hunger, violence, poverty, disease). In pairs, students will choose a social problem to research in a Spanish-speaking country of their choice. Students will use online resources to gather data related to their problem. Each pair will create a written report of the issue, its history, and a plan to address the problem. Students will brainstorm with other classmates for additional possible ways of addressing the problem. Finally, each pair of students will create and present a final version of their issue/solution using PowerPoint.

This task directly targets the following standards: 1.1, 1.2, 1.3, **2.1, 3.1** and **4.2**

Timeline: 3 blocks
Key vocabulary: vocabulary such as poverty, abuse, child neglect, hunger, illiteracy, violence, disease, homelessness, etc.
Resources: Self-generated vocabulary list, dictionaries, computers and Smartboard.

Common learning experiences:

- brainstorming session on social problems in our community
- View video clips of news reports from around the world
- writing a plan to address community problem
- peer editing
- creating a Power Point
- delivering an oral presentation about a community problem

Common assessments including the end of unit summative assessment:

- Summative assessment for vocabulary
- Performance assessment: final presentation of community problem graded using NEASC Rubric 3: Effectively communicates information for a variety of purposes
- Performance assessments: students will self-assess using NEASC Rubric 4: Critical Analysis/Thinking

Teacher notes:

- Teacher might want to compile a list of community resources to lead discussions
- Find and preview video clips
- Provide an ongoing vocabulary list as the students generate new words

Name of the Unit: 8 Food in the Spanish-speaking world	Length of the unit: 9-10 blocks (86 minute blocks)
Purpose of the Unit: Students will explore foods in the Spanish-speaking world. They will gain perspectives on their own beliefs and misconceptions about what Hispanic food really is. This unit will also allow students to look at the relationship between climate, geography, supply/demand and food around the world. Foundations for the unit are geography and basic vocabulary structures so that students can comprehend information from online searches.	

ACFTL Standards addressed in this unit:

- 1.1 Students engage in conversations, provide and obtain information, feelings and emotions and exchange opinions
- 1.2 Students understand and interpret written and spoken language on a variety of topics
- 1.3 Students present information, concepts and ideas to an audience of listener or readers on a variety of topics
- 2.1 Students demonstrate an understanding of the relationships between the practices and perspectives of the culture studied
- 3.1 Students reinforce and further their knowledge of other disciplines through the foreign language
- 4.1 Students demonstrate understanding of the nature of language through comparisons of the language studied and their own
- 4.2 Students demonstrate understanding of the concept of culture through comparisons of the culture studied and their own

Big Ideas:	Essential Questions:
• Your personal experiences affect your beliefs • Every country has traditional foods that vary by region • There is a relationship between geography, climate and diet	• What are the most common foods eaten in Spanish-speaking countries? • How do climate and geography affect food choice?
Students will know: • vocabulary for foods • ordinal numbers • command forms of verbs •	Students will be able to: • discuss common foods eaten in their specific Spanish-speaking country • reflect on their own beliefs and misconceptions regarding food • create a menu in Spanish that would

	be authentic for a specific region or country • describe, make and share a food item off of their menu • convert currency

Significant task 1: What's for dinner?

Students will use online resources to collect information about regional foods in their specific country. As a class, students discuss typical Hispanic foods. Then, students will use online resources to gather data related to foods typical to their country. Each student will create a written report of the typical, traditional foods from that country. Students will include the relationship between climate, geography, supply/demand and the foods.

This task directly targets the following standards: **1.1**, 1.2, **1.3**, 2.2**,** 3.1 and **4.2**

Timeline: 2-3 blocks
Key vocabulary: beans, potatoes, rice, papaya, guava, mango, pineapple, avocado, plantains, chicken soups, hot pepper, seafood and shell fish, cold soups, cilantro, beef, geography, weather
Resources: Self-generated vocabulary list, dictionaries, computers and Smartboard.

Significant task 2: Menu

Students will create a menu for their own "authentic" restaurant including those foods mentioned in their task #1 report. Students will individually research restaurants in their country and compile a menu using common, local foods and ingredients. Prices on the menu will be in the target country's currency and with a US dollar conversion.

This task directly targets the following standards: 1.1, **1.2**, 1.3, **2.1** and 4.2

Timeline: 3 blocks
Key vocabulary: beans, potatoes, rice, papaya, guava, mango, pineapple, avocado, plantains, chicken soups, hot pepper, seafood and shell fish, cocoa, cold soups, cilantro, beef, currency (peso, euro, sol, colon, Bolivarian)
Resources: Self-generated vocabulary list, dictionaries, computers, art supplies, online currency converter.

Significant task 3: Come and get it!

Each student will prepare and share a dish from their menu. They will create an instructional video or PowerPoint as each student prepares the recipe at home. (Or students may prepare the dish "live" in class.)

This task directly targets the following standards: 1.1, 1.2, **1.3**, 2.1, 3.1 and 4.2

Timeline: 2-3 blocks
Key vocabulary: foods, Basic commands, ordinal numbers (1-10)
Resources: Self-generated vocabulary list, self-created report, self-created menu, Computers, Smartboard, ingredients.

Common learning experiences:

- brainstorming session on typical Hispanic foods
- View video clips of food shows/online menus from various countries
- Online/library research on typical foods
- writing a brief report about traditional/typical foods in a specific country
- complete webquest of restaurants in specific country
- creating a menu
- creating a food item from the menu

Common assessments including the end of unit summative assessment:

- Summative assessment for vocabulary and concepts of the relationships between climate, geography, supply/demand and food around the world.
- Performance assessment: written report about foods graded using NEASC Rubric 3: Effectively communicates information for a variety of purposes
- Performance assessment: Menu to be graded with rubric
- Performance assessment: final presentation of food graded using NEASC Rubric 3: Effectively communicates information for a variety of purposes

Teacher notes:

- Teacher should contact parents/guardians ahead of unit to inform them of expense/time and/or to make alternative arrangements for their student
- Find and preview video clips
- Provide an ongoing vocabulary list as the students generate new words
- Provide guidance about food cost/availability

Windsor Public Schools
Curriculum Map
Astronomy
BOE Approval Date

Purpose of the Course: This course is an introduction to astronomy and space exploration. Starting with the study of the significant historical events and Astronomers that shaped the ideas of modern astronomy, the course examines the different components of the solar system, stars, galaxies and the universe as well as the challenges and benefits of space exploration.

Name of the Unit: Unit 1: Introduction to Astronomy	Length of the unit: 4 Blocks (86-minutes each)
Purpose of the Unit: Students will gain an understanding of the contributions of the main historical figures in astronomy. They will compare the theories of each scientist to the theories of their peers, gaining an understanding of how each scientist built their theories on the theories of their predecessors as well as how their new learning was affected by the society and government in which they lived. Students will also gain an understanding of gravity and orbital motion specifically as to how they pertain to the movement of celestial bodies. Students will also compare the size and scale of the solar system to the universe.	

State Standards Addressed in the unit: CT Science Frameworks-Enrichment Standards: Newton's laws are not exact, but provide very good approximations unless an object is small enough that quantum effects become important. NGSS: ESS1-4: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. College and Career Readiness Attributes: Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

Big Ideas: • Kepler's laws describe common features of the motions of orbiting object. • Celestial bodies move in elliptical orbits. • Distances in space are vast and require a unique vocabulary.	Essential Questions: • How do physical forces act on celestial bodies and influence their properties? • How does the time period in which a scientist lives influence their contributions to the study of astronomy? • Why do we need different vocabulary when talking about the scale of different systems?

Students will know:	Students will be able to:
• Astronomical terms for scale and distance • The relationship between distance from the sun and properties of the planet • Kepler's three laws • Scientist's names and their major contributions to Astronomy • The shape of orbits and how that determines certain planet properties	• Define introductory astronomical terms • Calculate gravity • Describe the shape of an orbit • Compare the scale of the solar system and the universe to the scale of other systems they are familiar with • Synthesize information on an Astronomer from multiple sources

Significant task 1:

In small groups students will investigate and become experts on a scientist who made a major contribution to the study of astronomy. Student groups will be provided reading materials pertaining to their assigned scientist, and may use a graphic organizer or note-taking sheets to organize their information. Group members will be assigned jobs such as facilitator, scribe and time keeper. Student groups will present their new learning about the scientist to the class during presentations utilizing a whiteboard, flipchart paper or some other visual strategy. During small group presentations, the rest of the class will take notes on the presentation utilizing graphic organizers or note-taking sheets. In a whole class discussion, students will construct a list of concepts, laws, etc. that these scientists contributed to the study of Astronomy.

Students will then investigate the astronomical scientific laws from the list created in class through student led demonstrations and/or laboratory investigation. Student groups will investigate gravity and orbits using a gravity laboratory investigation as well as an orbits laboratory investigation. Students will be organized in lab groups and assigned a specific role such as facilitator, data collector, recorder and reporter. Groups will report their findings with the rest of the class and complete laboratory analysis and conclusions.

Timeline: 2 blocks

Key vocabulary: geocentric, Ptolemaic model, heliocentric, ellipse, gravity, inertia, rotation, revolution, mass
Resources: Astronomy Today textbook, various scientific journal readings, other text, hoops, large paper roll, marbles, string, weights, meter sticks, timers

Significant task 2:

Working individually, students will calculate their age on different planets in the Solar System utilizing data on the rotation and revolution periods of each planet. In a whole class discussion, students will share their answers and show how they arrived at their answers mathematically. They will also discuss trends they see in the difference in the length of a day and the length of a year as they move outwards through the solar system. The teacher will introduce and define an astronomical unit and light-year as two ways scientists discuss distance in the universe. In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on size and scale. In small groups, outside, using chalk and a step chart, students will mark the distance between the sun and the planets. Students will compare the distance between planets, the planets and the sun and the difference in the

spacing between the inner and outer planets. Students will write a reflection pertaining to any misconceptions they had previously about size and scale in the solar system and what they learned from the solar system scale exercise.

Timeline: 2 blocks
Key vocabulary: astronomical unit, light-year
Resources: calculator, chalk, Starry Night software

Common learning experiences:

- Starry Night computer exercise on the size and scale of the Solar System
- Do Nows
- Large and small group collaboration
- Independent mathematical analysis of student age on different planets
- Gravity lab/demonstration
- Orbit lab/demonstration
- Individual student reflection on size and scale

Common assessments including the end of unit summative assessment:

- Astronomer Contribution Presentations (communication school wide rubric)
- KWL assessment
- Gravity and Orbit Labs/demonstrations conclusion questions
- Starry Night size and scale analysis questions

Teacher notes:

- This video demonstrates size and scale: http://www.youtube.com/watch?v=FjCKwkJfg6Y

Windsor Public Schools
Curriculum Map
Astronomy
BOE Approval Date

Name of the Unit: Unit 2: Earth, Moon, Sun	Length of the unit: 6 Blocks (86-minutes each)
Purpose of the Unit: In this unit students will investigate the movements of the Earth, Moon and Sun and compare them to each other. Students will understand how the movements of these celestial bodies cause night and day, the seasons, the phases of the moon, tides, solar eclipses and lunar eclipses. Students will differentiate between the rotation of the Earth and the revolution of the Earth as well as be able to describe surface features of the moon.	

Standards Addressed in the unit:

NGSS: ESS1.B: EARTH AND THE SOLAR SYSTEM
Earth and the moon, sun, and planets have predictable patterns of movement. These patterns, which are explainable by gravitational forces and conservation laws, in turn explain many large-scale phenomena observed on Earth.

CT Science Framework Enrichment Standard: Earth's Place in the Universe
Earth-based and space-based astronomy reveal the structure, scale and changes in stars, galaxies and the universe over time.

Big Ideas:	Essential Questions:
• Motions of objects in the solar system influence what we experience on Earth. • Moon phases, lunar eclipses and solar eclipses are all caused by the moon's changing position relative to the Earth. • Earth's movement through space affects what we experience on Earth.	• How do the motions of the Earth and Moon affect the Earth? • How does the moon move relative to Earth? • How does the tilt of Earth's axis affect the Earth?
Students will know: • How rotation and revolution cause day, night and year • Why the seasons on Earth occur • Why the moon goes through phases • Why lunar and solar eclipses occur • How tidal forces occur and why there are tides on earth	Students will be able to: • Explain the cause of Earth's day/night and year • Determine the cause of Earth's seasons • Explain why the Moon has phases • Compare and contrast the causes and properties of solar and lunar eclipses • Support the reason for tides on Earth

Significant task 1:

The teacher will demonstrate the two types of celestial movement, rotation and revolution, while students come up with a definition of each term as well as differentiate between them in a whole class discussion. A student leader will be chosen as the scribe and will facilitate the conversation as well as write the information on the whiteboard or using the computer, project the information using the interactive projector. Students will be grouped into small groups of 2 or 3. Groups will be given globes, flashlights and dry-erase markers and asked to model a day/night cycle (rotation) on Earth using the flashlight to represent the sun and the marker to draw a person on the globe for a reference point. Groups will be given questions to answer to help guide their rotation demonstration as well as check for understanding. Groups will collaborate with and share out with another group what they have learned. In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on rotation.

In the same small groups as the rotation exercise, students will again be given globes, dry-erase markers, and guiding questions. The room will be set up with constellation cards spaced around, evenly and at the same height as a centrally located lamp with a bare, non-frosted bulb. Lights are turned off and student groups will model revolution/year and seasons with their globes using the provided revolution/seasons questions as a guide. Groups will collaborate with and share out with another group what they have learned. In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on revolution and seasons.

Timeline: 2 blocks
Key vocabulary: rotation, revolution, hemisphere, diurnal motion, constellation, axis, ecliptic, latitude
Resources: globes, flashlights, whiteboard markers, Starry Night software, constellation cards (Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpius, Sagittarius, Capricorn, Aquarius and Pisces), North star card, lamp with a non-frosted bare bulb

Significant task 2:

Using what they know about rotation and revolution students will complete a think/pair/share exercise focusing on the question “Why does the moon’s shape change over time?” When pairs of students have completed sharing, students will watch the 3:43-minute youtube video “Mr. Lee - Phases of the Moon Rap” or similar video clip and create a visual representation with labels of each of the phases of the moon in their Astronomy notebook. In groups of two or three students will create a moon representation out of a Styrofoam ball with a face on it on a stick. Groups will set up a lamp with a non-frosted bulb towards one side of their work space. Student groups will then mimic the moon orbiting the Earth, using the lamp to represent the sun student heads to represent the Earth and the Styrofoam ball on a stick to represent the moon. The face on the Styrofoam ball represents the lit part of the moon that is visible from Earth. Groups will answer the discussion questions associated with the activity and when each group is finished, students will come together for a whole class discussion and review about what they have learned. In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on the features of the moon, phases of the moon and tides.

Timeline: 2 blocks
Key vocabulary: orbit, new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, last quarter, waning crescent, high tide, low tide, neap tide, maria, crater, highland, lava plain
Resources: http://www.youtube.com/watch?v=79M2lSVZiY4 *Phases of the Moon Rap*, lamps with non-frosted bare bulb, Styrofoam ball on a stick or pencil, Directions and discussion questions for phases of

the moon activity, Starry Night software

Significant task 3:

Students will individually complete the first two parts of a KWL activity on lunar and solar eclipses. When they are complete, a student will lead the class in a discussion about what they already know and what they want to learn, completing a chart on the computer that will be shown to the entire class on the interactive projector. Students will then be split up into their groups from the moon phases activity. The room is set up as it was for the phases activity and students will recreate eclipses as well as answer discussion questions based on the activity. Students will then meet with one other group to discuss what they learned and compare their new learning to the new learning of the other group. An exit slip comparing and contrasting lunar eclipses to solar eclipses will be collected. As a whole class, students will be shown a video clip on solar and lunar eclipses. Students will be asked to write a reflection on how they would feel if they had seen an eclipse before mankind knew what they were and how they were caused as well as how these feelings and experiences may contribute to mankind's pursuit of scientific inquiry to explain certain phenomena. In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on eclipses.

Timeline: 2 blocks
Key vocabulary: eclipse, lunar eclipse, solar eclipse, total eclipse, partial eclipse, shadow, syzygy, annular eclipse, totality, corona, umbra, penumbra
Resources: lamps with non-frosted bare bulb, Styrofoam ball on a stick or pencil, Directions and discussion questions for eclipse activity, eclipse video, Starry Night software

Common learning experiences:

- Do Nows
- Rotation demonstration group work
- Revolution demonstration group work
- Eclipse demonstration group work
- Starry Night simulations

Common assessments including the end of unit summative assessment:

- Starry Night analysis questions
- Rotation guiding questions
- Revolution guiding questions
- KWL on eclipses
- Eclipse reflection

Teacher notes:

- For significant task 1, when setting up the constellation cards around the room, make sure that here is enough room for students to walk between the cards and the lamp. Tape the North Star high up on the wall.

Windsor Public Schools
Curriculum Map
Astronomy
BOE Approval Date

Name of the Unit: Unit 3: Solar System, Planets and Small Bodies	Length of the unit: 10 Blocks (86-minutes each)
Purpose of the Unit: In this unit students will investigate the different celestial bodies that make up our solar system. Students will know how the composition and orbits differ between the inner and outer planets, moons, comets, asteroids, meteoroids, meteors and meteorites. Students will categorize these objects and decide their origin.	

Standards Addressed in the unit:

HS-ESS1-2: construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.

HS-ESS1-6: Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.

CT Enrichment Standards: Earth-based and space-based astronomy reveal the structure, scale and changes in stars, galaxies and the universe over time.

Big Ideas:	Essential Questions:
• Planet characteristics correlate to distance from the sun. • Natural satellites vary in number and properties with distance from the sun as well as type of planet they orbit. • The solar system has numerous smaller objects which have collided with Earth.	• How and why do the inner planets differ from the outer planets? • What are some characteristics of planetary moons and how might humans benefit from them? • What are the other objects in the solar system and how do they help explain the origin of the solar system and universe?
Students will know: • Heavier elements in the solar system are mostly located closer to the sun whereas the lighter elements are mostly located farther out • Orbits of solar system objects depend not only on the gravitational pull of the sun but also on the gravitational pull of nearby celestial objects	Students will be able to: • Compare characteristics of the inner planets to the outer planets • Evaluate the arguments both for and against Pluto's status as a planet • Synthesize new learning on the characteristics of the planets and orbital planes to compose a working definition for the word "planet"

Significant task 1:

In groups of 2 or 3 students will create a list of celestial objects that are in our solar system. Groups will share out with the entire class and students will add the completed list to their Astronomy notebooks. Groups will then create a description of each type of object in their notebooks, utilizing textbooks, reference books and or the internet. In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on the composition of the solar system. Students will see what the components of the solar system look like, determine the paths of the celestial bodies through the solar system, compare orbits of major planets, minor planets and other objects, as well as provide evidence of how we know planets do not give off light.

Students will construct two scale models that illustrate the size and scale of the solar system. In small groups students will divide a clump of modeling clay into 50 equal sized balls; choose one ball and then combine the other 49 back into one ball. These represent the Earth and its moon. Students groups will first predict the distance between their scale model Earth and moon and then measure the correct separation between the two. Groups will answer the discussion questions and then share out with the whole group. In the same small groups, students will create a scale model of the solar system outside using the solar system step chart and chalk on the blacktop. In a whole class discussion ask, "is the solar system more or less crowded than you thought?" "Is Pluto closer or farther away than you thought?" "Can you explain why the planets are divided into two groups?" In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on the size and scale of the solar system.

Timeline: 2 blocks
Key vocabulary: Sun, star, planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus, Pluto, satellite, moon, comet, asteroid, meteoroid, meteor, meteorite, astronomical unit
Resources: clay, Starry Night software, chalk, solar system step chart, tape measure or meter stick

Significant task 2:

In groups of 2 or 3 students will research a planet in the library. When complete, groups will create a tourist/travel commercial, presentation or brochure, convincing classmates why they should visit that planet. Groups will present their commercials or brochures in class while the observers assess each groups presentation and decides which planet they would visit and why.

In the computer lab, working in pairs, students will use the Starry Night simulation software to complete an exercise on the composition, topography, calculate the length of orbits as well as describe the different shapes of orbits, length of rotation, explain the cause of retrograde motion and other characteristics of the inner and outer planets. Students will be asked to calculate their age on other planets, describe the relationship between two characteristics of planets and to hypothesize about what if any additional planets (Major or minor) may exist beyond Neptune's orbit. Students will finally compare the motion of the sun and planets in an Earth centered view versus and sun centered view.

Students will read Part 1 and in groups of two complete the questions and activities for the case study "A Rose By Any Other Name: The Peculiar Case of Pluto." In groups of four or five have students go over their answers to the questions on part 1 as well as express their opinion about the vote. As a whole class, vote on whether Pluto should be considered a planet or not. In groups of four or five, students meet as the Committee on Small Body Nomenclature using the questions at the end of Part 2 to facilitate their discussion. Groups will summarize their discussion in a written statement and submit it as

the official IAU (International Astronomical Union) position. This summary should include their definition of a planet as well as determine Pluto's status. The committee chair reads the statement to the class and the class will compare the decision to that of the other groups.

Timeline: 4 blocks
Key vocabulary: Sun, star, planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus, Pluto, satellite, moon, crater, canyon, nomenclature, retrograde
Resources: http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=209&id=209, Starry Night software, Astronomy textbook, internet, projector

Significant task 3:

In groups of three, using a graphic organizer, students will compare and contrast asteroids, meteoroids, meteors, meteorites and comets. Groups will pair up with other groups to compare lists. In the computer lab, working in pairs, students will use the Starry Night simulation software to contrast asteroids to background stars, locate where asteroids can be found in the solar system, describe the shape of their orbits, determine speed of asteroids and compare it to the speed of planets in orbit, calculate length of the asteroids orbits, describe the appearance of a comet as well as what happens to its tail as it nears the sun. They will describe the shape and size of a comets orbit, predict when a comet will be visible on Earth again, describe the circumstances necessary for a meteor shower on Earth, compare and contrast asteroids to comets.

In groups of three or four, students will assign group roles and then will create a comet nucleus using dry ice, water, dirt, molasses, and ammonia. As the nucleus sublimates, student groups will record their observations and answer the discussion questions. Groups will share out with the class what they learned about how the composition of the comet determines some of its physical and behavioral characteristics.

Teacher will show the class a video clip (less than a minute long) of the Park Forest meteorite and then pass around some meteorite samples while discussing what they would do if they saw that in the night sky as well as how they may feel. In small groups of five or less, students will assign group roles and then begin the case study reading for "The Zarkah Stone: The Park Forest Meteorite Case". Groups will answer the questions that follow the reading for part 1 and share out as well as check for understanding using a Café conversation model. Students reconvene in the original groups to complete the second reading and then recount the cosmic history of the Zarkah stone in a creative format such as a graphic novel, news report, poem, song, etc. Student groups will also write a short essay detailing what they think the Zarkah family should do with the stone and why?

Timeline: 4 blocks
Key vocabulary: orbit, elliptical, comet, asteroid, meteoroid, meteor, meteorite, meteor shower, Oort cloud,
Resources: dry ice, water, soil, molasses, rubbing alcohol or ammonia, freezer plastic bags, dishpan, plastic bowels, wooden spoons, thick winter gloves, lamp with 100 watt bulb, cloth towels, goggles, hammer, http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=165&id=165, textbooks, reference books, internet, http://www.youtube.com/watch?v=pFKCDpow3ls, roll of large paper, markers

Common learning experiences:

- Do Nows
- Size and scale models
- Planet Project research
- Case studies
- Café conversation
- Create a comet
- Starry Night simulations

Common assessments including the end of unit summative assessment:

- Scale of the solar system discussion questions
- Planet Project presentation
- Starry Night analysis questions
- Case studies discussion questions
- Comet observations and discussion questions
- Meteorite history report and essay

Teacher notes:

- School wide rubrics can be used for the oral presentation on the planets.
- Part 1 of the Pluto case study as well as the Zarkah Stone Meteorite case study can be assigned for homework if necessary.
- Directions on how to make the comet as well as the discussion questions are in the Starry Night binder D2.2-D2.3
- 48-minute video on the meteorite in Russia 2003 here: http://www.youtube.com/watch?v=G04soErp4J8

Windsor Public Schools
Curriculum Map
Astronomy
BOE Approval Date

Name of the Unit: Unit 4: Sun and Stars	Length of the unit: 8 Blocks (86-minutes each)
Purpose of the Unit: In this unit students will investigate the composition, structure, surface features and weather on the sun. Students will connect these properties of the sun to phenomenon that occur on Earth as a result. Students will investigate properties of the other stars in the universe and learn about the life cycle of stars. They will also differentiate the life cycle of a massive star versus a smaller star.	

Standards Addressed in the unit:

HS-ESS1-1: Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.

HS-ESS1-3: Communicate scientific ideas about the way stars, over their life cycle, produce elements.

CT Enrichment Standards: Earth-based and space-based astronomy reveal the structure, scale and changes in stars, galaxies and the universe over time.

Big Ideas:	Essential Questions:
• The Sun is the source of most of Earth's energy. • The other objects in the solar system are by-products of the formation of the Sun. • The distance between stars in unimaginably huge. • The Milky Way is a collection of stars, gas and dust.	• How does the sun affect life on Earth? • How did the sun and solar system form? • How do scientists learn about the universe?
Students will know: • The sun is just an average star • The size of a star determines it's life cycle • The energy from the sun is responsible for photosynthesis, wind, ocean currents, and the water cycle • The energy from the sun comes from the fusion of hydrogen into helium • Solar "weather" creates auroras and can interfere with satellites. • The solar system is 4.5 billion years old • The gravitational pull of a black hole is so strong not even light can escape it	Students will be able to: • Calculate the velocity of star movement • Calculate energy gained by water from the sun • Formulate a theory of what might happen to Earth if the sun's energy output changed over time. • Label features of the sun • Differentiate between fusion and fission • Describe how the aurora forms • Compare distances in light years • Differentiate between apparent magnitude and absolute magnitude • Relate the color of a star to its temperature

• The center of the Milky Way is a black hole • The difference between wave-length and wave-height as it pertains to energy • The difference between red and blue shift for the motion of objects	• Calculate density • Theorize ways to keep objects from falling into black holes

Significant task 1:

Students will complete the first two sections of a KWL activity, listing what they know about the sun and what they want to know. Students will turn and talk to their partner to share what they listed and then groups of two will share with another group of two. Students will add to their lists as they speak with others in the class. Groups of four will share out with the class and a classroom scribe will document answers on the whiteboard. The teacher will then ask, "why do you feel warm when you stand in the sunshine?" prompting for students to identify radiation as the type of energy transfer as well as a description. In groups of 2, students will complete a lab calculating the power output of the sun in watts per square meter. Students will fill jars half full with room temperature water, place stoppers over the openings of the jars and place a thermometer in the hole in the stopper so that the 10-20 degree Celsius range is above the water. They will place a small amount of ink in each jar of water (just enough to turn the water black), take a starting temperature and then place the jar in full sunlight. Groups record the temperature of the water after 20 minutes. Students will then measure the height and width of the water "target" in the jar and calculate the area as well as the volume of water in the jar by pouring it into a graduated cylinder. Students will calculate the change in temperature, the effective area of the water and the energy gained from the sun by the water as well as the power delivered to each jar by the sun. Data will be shared with the class and documented by all students. Student groups of 4 will then answer the conclusion questions associated with the activity and share out with the class.

In groups of 2 students will complete a Starry Night simulation activity in the computer lab on the sun as a source of energy. Student pairs will calculate the length of a solar day, sketch the sun labeling the corona, photosphere, chromosphere, sunspots and prominences and compare nuclear fusion to nuclear fission. In the same groups, students will also label a diagram of the sun with its surface features and "weather" characteristics. They will run a time lapse simulation, documenting the features observed and formulate a theory about the possible connection between surface features of the sun and auroras. Students will fill out the section of the KWL activity from the first class on the sun. They will then share with another student and add to the list as necessary.

In a whole group, students will watch a 14-minute video on the formation of the solar system http://www.youtube.com/watch?v=46hH0ZW63uE. The class will then break into groups of three. Groups will assign roles (facilitator, scribe, speaker) and will create a visual representation/flow chart of the formation of our solar system. Students will prepare an explanation to go along with the flowchart and will give a presentation in class.

Timeline: 3 blocks
Key vocabulary: radiation, sun, star, sunspots, solar prominences, solar flares, solar wind, aurora, geomagnetic storm, magnetic cycle, corona, photosphere, chromosphere, nuclear fusion, hydrogen, helium
Resources: Half quart glass mason jars, rubber, cork or foam stoppers for jars with a small central hole in them, thermometers that read at least 20-40 degrees Celsius, timers, graduated cylinders, water, India

ink, Starry Night software, Starry Night binder with lab directions and discussion questions, KWL chart, poster paper, markers, Sun diagrams and feature labels, computer, projector

Significant task 2:

In groups of three students will build a scale model representation of the Big Dipper using a box, marbles and string (using a scale of 1mm=1 light year). Groups will discuss as a whole class whether or not they can recognize the Big Dipper from the side. Are all of the stars the same distance away? Can you tell, just by looking, which stars are farther and which are closer? Students will calculate how far away the stars will be in 100,000 years and figure out the percentage closer they will be to the sun. Students will then discuss in small groups questions such as, whether they think stars move fast and will the stars be much closer to the sun in 100,000 years?

In a darkened room, pairs of students will set up a lamp with an unfrosted bulb on a rheostat. Students will then document their observations as they turn the lamp up and down. What color is the filament at each stage? When is the bulb hotter? Pairs of students will team up with other pairs to write a conclusion statement about what they observed in the exercise. Each group of four students will next use two flashlights, one large and one small, to observe how brightness depends on distance (apparent magnitude) as well as actual brightness (absolute magnitude). Students will document their observations and answer the following question: What conclusions can you draw about the stars Rigel and Sirius pertaining to their comparative brightness? Students will then create a graph plotting the color of stars and their temperature as well as their mass (thereby creating a mini Hertzsprung-Russell diagram).

Given a variety of teacher-selected articles about black holes, individual students will read and summarize one article. They will then meet and share with at least 3 other students to discover what their article was about. They will take notes in their astronomy notebook on what they learn from other students. Students will watch a short video clip on black holes http://www.youtube.com/watch?v=3pAnRKD4raY and then simulate the collapsing of stars at the end of their lifecycle with white bread. Groups of two will measure the volume of their slice of bread and then the mass. They will calculate its density and then crush and compact the slice of bread into the smallest possible volume. Student groups will then calculate its new volume and density so they can compare it to the original density. Next, students groups will create their own black hole representations out of balloons and flower pots. After cutting the top off the balloon and securing it around the top of a flower pot, student groups of two will use BB's to represent objects orbiting a black hole. They will make observations pertaining to the behavior of the BB's, the velocity of the orbit as they approach the black hole and they will create ways to prevent the BB's from falling into the black hole. Student groups will present to the class how they were able to prevent their object from falling into the black hole.

Timeline: 3 blocks
Key vocabulary: radial velocity, light year, galaxy, milky way, luminosity, absolute magnitude, main sequence, apparent magnitude, supernova, neutron star, black hole, H-R diagram (Hertzsprung-Russell)
Resources: boxes, marbles, string, Starry Night software, balloons, flowerpots, string, ball bearings or BB's, rulers, balances, white bread, various articles on black holes

Significant task 3:

Using small whiteboards, students will "Brain Drain" in small groups all of the different ways scientists learn about space and the objects in it. The teacher will prompt the class to think of the different tools they use, what those tools actually do, how do the work, and is there any way to study any of the items

in space first hand? Hands on? A student leader will prompt the different groups to share out and create a table on the board, organizing all of the ideas. The teacher will introduce the use of light from stars to study the objects in the galaxy and universe. Students will read an article about the electromagnetic spectrum and answer the comprehension questions. In groups of two students will discuss what they learned and create at least one higher level question for the class to answer. Student pairs will then complete a graphing lab on the different wavelengths of the electromagnetic spectrum, as well as red-shift and blue-shift.

Timeline: 2 blocks
Key vocabulary: electromagnetic spectrum, light year, red-shift, blue-shift, wavelength, wave height
Resources: Whiteboard, dry-erase markers, Starry Night software, electromagnetic spectrum article

Common learning experiences:

- KWL
- Do Nows
- Starry night Simulations and exercises
- Black hole article summary
- Compression activity
- Black hole simulation
- Brain Drain
- graphing activity

Common assessments including the end of unit summative assessment:

- Solar heating lab
- Starry Night questions
- Presentation on formation of solar system
- Presentation on black holes
- higher level electromagnetic question

Teacher notes:

- Students may come up with radiation as the type of energy transfer during the KWL activity and so you may skip the next questioning.
- Solar heating lab may be done inside or outside.
- Students can determine the scale for the Big Dipper activity themselves.

Windsor Public Schools
Curriculum Map
Astronomy
BOE Approval Date

Name of the Unit: Unit 5: Galaxies and the Universe	Length of the unit: 4 Blocks (86-minutes each)
Purpose of the Unit: In this unit students will learn about the Big Bang Theory and will discover the composition and structure of the universe. Students will differentiate between the different types of galaxies and calculate distances and velocities in space as well as locate the solar system in the Milky Way, provide evidence supporting the Big Bang Theory and begin to discuss limitations in space travel.	

Standards Addressed in the unit:
HS-ESS1-2: Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. CT Enrichment Standards: Earth-based and space-based astronomy reveal the structure, scale and changes in stars, galaxies and the universe over time.

Big Ideas:	Essential Questions:
• The universe is mostly space. • Galaxies make up most of the visible universe and are very far apart. • Galaxies come in different shapes and sizes. • The Big Bang Theory describes one possible origin of the universe.	• How did the universe form? • What does the shape of a galaxy indicate? • Why can't humans see the entire Milky Way? • Why can't humans travel to other galaxies?
Students will know: • The solar system is located 26,000 light years from the center of the Milky Way • Galaxies consist of billions of stars • Galaxies consist of the same basic materials and are subject to the laws of physics • Red-shift and cosmic microwave radiation support the Big Bang Theory	Students will be able to: • Differentiate between the three types of galaxies • Locate our solar system in the Milky Way galaxy • Calculate the velocity of the solar system • Calculate distances between stars • Describe the Big Bang Theory
Significant task 1: In groups of three, students will use information gathered from resources such as their *Astronomy Today* textbook, scientific articles, the internet or other appropriate source to investigate the 3 main types of galaxies and document their new learning in their Astronomy notebooks. Student groups will create their own spiral galaxy representation using a CD, a marble and sharpie in order to make	

observations and answer discussion questions such as “If the Milky Way galaxy is a flattened disk of star, why do we see stars around us in all directions?” and “What is the forward velocity of the solar system as it moves in orbit around the galaxy’s center of mass?”. Each group will share out one question with their answer with the class. Pairs of students will calculate and create a scale model of a galaxy similar to the Milky Way using spheres of approximately 1cm. Students will use their scale model to determine the main properties of their galaxy such as the average distance between stars and diameter of the galaxy.

In groups of two, students will then take a journey through the Milky Way utilizing the Starry Night software. Groups will draw a picture of the Milky Way, document the location of the sun in the Milky Way, record their observations about the shape of the Milky Way from different points of view and discuss why they cannot see the Milky Way from a large city as they “travel” through the galaxy.

Timeline: 2 blocks
Key vocabulary: galaxy, Milky Way, spiral, elliptical, irregular
Resources: Whiteboard, dry-erase markers, textbooks, articles, internet access, Starry Night software, 1 cm spheres

Significant task 2:

Individually, students will read a short explanation of the Big Bang Theory. Students will create a flow chart or other graphic organizer in their Astronomy notebooks, depicting the formation and expansion of the universe. In groups of 2, students will model the expansion of the universe using balloons. Student pairs will draw galaxies on the balloon and then blow it up slowly. Pairs will make observations and record measurements (distance) as they blow up the balloon.

In pairs, students will complete a composition of the universe activity on the computer. Students will list and describe objects that make up the universe, compare objects to one another, observe the size and shape of different objects, identify galaxies by shape, calculate how old objects are that are being observed and discuss how scientists are able to use red-shift, blue-shift and cosmic microwave radiation to gather data on objects that are far away and the universe.

Timeline: 2 blocks
Key vocabulary: universe, disk, electromagnetic spectrum, light year, Big Bang Theory, sheets, filaments, dark matter, red-shift, blue-shift, cosmic microwave radiation
Resources: balloons, sharpies, textbooks, Starry Night software

Common learning experiences:

- Big Bang Theory reading
- Universe model with balloons
- Calculate the distance between stars, etc.
- Starry Night simulation
- Galaxy representation

Common assessments including the end of unit summative assessment:

- Big Bang flowchart or other graphic organizer
- Galaxy discussion and observation questions
- Universe discussion and observation questions

Teacher notes:

- Blueberries or peas work for the scale model of the Milky Way activity

Windsor Public Schools
Curriculum Map
Astronomy
BOE Approval Date

Name of the Unit: Unit 6: Exploration and Technology in Space	Length of the unit: 10 Blocks (86-minutes each)
Purpose of the Unit: Students will investigate different types of tools used in space exploration. They will design their own space craft based on the needs of a mission they create. They will analyze a space mission in a case study and discuss the benefits as well as the consequences of space exploration. The possibility of extra-terrestrial life will be investigated and students will create their own E.T. with form and function specific to a solar system object of their choosing.	

State Standards Addressed in the unit:

CT Science Framework Enrichment Standard: Earth's Place in the Universe
Earth-based and space-based astronomy reveal the structure, scale and changes in stars, galaxies and the universe over time.

Big Ideas:	Essential Questions:
• Humans are dependent on Earth's environment for life. • Space exploration requires knowledge from many different areas be combined. • There are pros and cons to space travel.	• How do astronauts live in space? • How do astronomers use spectra to learn about distant objects? • Are there other life forms in space? • Is space travel necessary?
Students will know: • Why spaceships and spacesuits must be insulated • The necessary components of a space mission, space craft and space suit • Spectrum from celestial objects carries information about that object • Life forms evolve to fit their environment	Students will be able to: • Design a space probe for travel to another solar system • Analyze spectra from different objects to determine properties of that object • Analyze a space mission to determine if it was planned correctly and "worth it" • Create a model of a life form with appropriate characteristics for its environment

Significant task 1:

On the overhead projector, teacher will show images of the sun from observatories and satellites in different wavelengths of the electromagnetic spectrum, weather satellite images and satellite images of the auroras. Students will discuss in pairs what other things man-made satellites are used for. A student leader will create a list on the board on the items the pairs of students have brainstormed.

In small groups students will assign roles and then build a coffee can satellite to test if insulation makes a difference to the interior environment of the satellite. Students will create one black satellite and one white satellite, testing them first with no insulation and then with insulation in place. Cans will be placed in the shade to obtain a baseline temperature and then in the full sun or heat lamp for 30 minutes. Temperatures will be recorded and then cans are cooled off, insulated and a baseline temperature is again recorded. Cans are place in the sun or heat lamp again for 30 minutes. Observations will be made, temperatures will be recorded and student groups will write up a conclusion paragraph tying what they learned to how this learning can be applied to the engineering of a satellite, space probe or other spacecraft.

Students will pair up to complete a Starry Night exercise on satellites, their movements, speed, names, purposes of different satellites, environmental factors satellites must endure, and what happens upon re-entry to Earth's atmosphere. Students will answer "How do satellites benefit humans?" and "Do you think space near Earth is getting crowded? Explain."

In groups of four, students will research a recent space mission. Information such as objective of the mission, timeline, trajectory, components of spacecraft, onboard experiments, expected scientific results, and actual results will be gathered and communicated in a form of their choosing. Student groups may submit a written report, a PowerPoint, Prezi or any other form of communication approved by the teacher, to the teacher. Groups will then design a hypothetical space mission of their own. They will choose a solar system object they wish to explore, list what they already know about it, decide what they want to know about it and why they think it's important. Groups will then design a space probe to study that object. They will develop a timeline, trajectory and velocity that are appropriate for the mission. They will design all necessary components including remote and/or direct sensors, propulsion, power supply and communications systems as well as environmental protection for the trip and destination. Next, they will create a visual of their spacecraft to present in class with all of the components labeled with its purpose and how it will function as well as the results you expect to receive from your spacecraft. Finally, students will create a table comparing each component of their spacecraft to the structures and function of the human body.

Timeline: 5 blocks
Key vocabulary: Satellite, sustainable, radiation, meteorites, micrometeorites, robots, space probes, cosmos, trajectory, velocity
Resources: http://www.noaa.gov/satellites.html, http://www.weatheroffice.ec.gc.ca/satellite/index_e.html, coffee cans with covers, thermometers, paint (black and white), small jars or cans, small cotton or terrycloth towels, cardboard, Styrofoam insulation, aluminum foil, heat lamp (or sun)

Significant task 2:

In a whole group, students will list tools that astronomers use when researching space and what each tool is used for. Each student will then build their own spectroscope to examine light from several different light sources. Students will make observations about what they see when using their spectroscope to look at different light sources such as what colors they see, what order are they in and then will compare light sources spectra. In groups of two, students will examine, analyze and compare spectra from four different galaxies and report out on what they have learned about their galaxies to the class.

Students will participate in a case study about the social, political and physical problems of space travel.

Students will individually pre-read part one of the case study entitled “Lost in Space”. Students will arrange desks in a circle and the teacher will ask for volunteers to read for Patricia and Kaleen. In the center of the circle of desks, the two students will read the case study aloud, acting out the parts. When they have finished, the class will discuss the part one questions, with every student taking a turn to voice their opinion. Students will then break into groups of two. Groups will read part two silently and then answer the questions to part two in their astronomy notebooks. Groups will move onto the reading of part three and answer those questions in their astronomy notebook as well. Students will move desks into a circle formation again and take turns reading aloud the fourth part of the case study. Students will then come up with ideas of what Patricia should do in this situation. Once they have shared what they would do, students will pair up and defend their decision to their partner, providing evidence, which the listening partner documents. Student groups will then go on to answer the last two questions and then will share with the class.

Timeline: 3 blocks
Key vocabulary: telescope, spectroscope, parallax, red-shift, reflector, refractor, spectra, extra-terrestrial, hospitable, diameter, aphelion, perihelion, climate, pressure, altitude, Olympus Mons, Mars, greenhouse effect, sublimes, absorption line
Resources: diffraction grating, cardboard tubing 30 cm long, tape, scissors, aluminum foil, cardstock, metric rulers, different light sources
http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=418&id=418

Significant task 3:

Student groups of two will be given a message we have intercepted from outer space. The message is a pattern of x’s that they must translate to figure out what the alien life forms are trying to tell us. Groups will then debate, providing evidence for their thinking, and vote on which group(s) are right.
In groups of two, students will pick a location in the solar system and design a life form that would be able to live there. Student groups will create a visual representation such as a model, diagram of the life form, labeling the different physical characteristics and documenting the correlation between environment, form and function. Groups will present life forms to the class and peers will evaluate E.T.’s. based on criteria such as appropriate characteristics, clear connection between form and function, creativity, etc.

Timeline: 2 blocks
Key vocabulary: form, function, alien, extra-terrestrial
Resources: internet, computer

Common learning experiences:

- Do nows
- Coffee can satellites
- Starry night simulations
- Case Study Activities
- Spectroscope lab
- Interpreting a message from space

Common assessments including the end of unit summative assessment:

- Coffee can conclusion paragraph
- Starry Night questions

- Spectroscope lab analysis and conclusion questions
- Build an alien

Teacher notes:

- The case study in this unit provides an opportunity for the teacher to do some direct reading instruction. A word wall or vocabulary bookmark would be useful.

Windsor Public Schools
Curriculum Map
Microbiology and Disease
BOE Approval Date

Purpose of the Course:
This course examines the world of microbes and disease. The prevention, transmission and diagnosis of various diseases are discussed as well as microbial structure, genetics, ecology, and evolution. Special attention is given to contemporary and historical health problems such as influenza, AIDS, Lyme disease, and salmonella poisoning. Lab experiences will include bacteriology techniques and microscopy.

Name of the Unit: Unit 1: Types and Characteristics of Microorganisms	Length of the unit: 5 Blocks (86-minutes each)
Purpose of the Unit: Students will analyze different types of microorganisms and their defining characteristics. They will be introduced to basic laboratory microbiological techniques and proper microscope use, which will be revisited and refined throughout the course. Students will compare various microorganisms based on cellular structure, molecular biology, and biochemical composition. They will also compare characteristics of viruses and parasitic organisms. The sizes, types, and methods used to visualize microorganisms will also be explored.	

State Standards Addressed in the unit:

CT Science Frameworks – 10.2 – Microorganisms have an essential role in life processes and cycles on Earth.

CT Science Frameworks – Enrichment Standards
The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. Prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure. Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings

Organisms have a variety of mechanisms to combat disease. There are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.

Big Ideas:	Essential Questions:
• Microbes are incredibly small and are everywhere • Microbes are essential to all other life on Earth • There are many techniques that are used to compare and study microorganisms	• Are microbes "germs"? • From the standpoint of humans, why is it important to study microorganisms? • How do viruses and other parasitic organisms compare?

Students will know:	Students will be able to:
• The major differences between prokaryotes and eukaryotes • Various techniques to culture and identify bacteria • Various methods used to visualize microorganisms • Defining characteristics of microorganisms	• Demonstrate appropriate laboratory safety skills and techniques for working with microbes, such as aseptic technique, mixing and sterilizing culture media, culturing bacteria, and using the Gram stain to identify bacteria • Distinguish between different kinds of microorganisms based on cellular structure, molecular biology, and biochemical composition • Describe how viruses differ from other parasitic microorganisms • Compare relative sizes of microorganisms and different types of cell shapes and cell types

Significant task 1: How Big Are Microbes And How Can They Be Studied?

In whole group, students will view the website http://learn.genetics.utah.edu/content/begin/cells/scale *Cell Size and Scale* where they will compare the size of items from a coffee bean down to a carbon molecule. After viewing and discussing cells visible to the human eye and those that are not, students will be given instruction in proper care and use of microscopes. Students will then transition to lab stations with microscopes. At the lab stations, students will individually view and illustrate 2 specimens (bacteria and Amoeba) preserved on microscope slides; they will also be asked to describe these specimens in words, recording observations in their individual lab notebooks, as well as measuring the size of the microbes using micrometers. Groups of students will then calculate the actual size of the specimens they viewed. Students will complete an exit card answering "How big is small?"

To further investigate the techniques and instruments necessary to study microorganisms, the teacher will display a variety of basic microbiology lab equipment to all students. Each student will choose one lab instrument and using the internet in the computer lab, research the use of the item, and present information to the class in a brief (2-minute) demonstration. Students will record the names and uses of each instrument on a graphic organizer in their laboratory notebook.

The teacher will then instruct and demonstrate to the class how to mix and sterilize culture media and pour into petri dishes as a means of growing microbial cultures. In small groups, students will perform this procedure and will be instructed on aseptic technique using stock "safe" bacterial cultures – these cultures will be incubated an observed in a subsequent class, when students will observe and describe in writing the microbial colonies. Student pairs will be provided with stock bacterial cultures and will take samples to prepare and stain a microscope slide in order to view their bacteria. Students will be able to view samples of both stained and unstained bacteria with the microscope for comparison. In whole group, the teacher will demonstrate how to carry out the Gram staining procedure after the teacher has presented the use and importance of the Gram stain. Using a descriptive, illustrated protocol, student pairs will Gram stain two different types of bacteria and diagram the stained cell types using the microscope. Students will be evaluated on aseptic technique, Gram staining procedure, and their illustrations.

Timeline: 3 blocks (86-minutes each)
Key vocabulary: microscope, microscopic, microbe, magnification, Petri dish, Gram stain, Bunsen burner, aseptic technique, culture loop
Resources: Learn Genetics website: http://learn.genetics.utah.edu/content/begin/cells/scale/, microscopes, prepared specimens, microbiology lab equipment

Significant task 2: Types of Microorganisms

The teacher will give direct instruction on the differences between prokaryotic and eukaryotic cells. Using a series of unlabeled electron micrographs and unlabeled diagrams, pairs of students will explore the differences between prokaryotic and eukaryotic cells. Students will complete a graphic organizer comparing these types of cells based on cell structure.

The teacher will provide direct instruction to the whole class comparing viruses and other parasitic microorganisms. Students will revisit the Learn Genetics website to gather, analyze, and evaluate the evidence for the endosymbiotic origin of eukaryotic cells. Each student will complete a written paragraph justification of why or why not they believe this theory is correct. The class will be divided into groups based on those in favor of the theory and those that are not in favor of the theory, and a debate between both sides will ensue, facilitated by the teacher.

Timeline: 2 Blocks (86-minutes each)
Key vocabulary: prokaryote, eukaryotes, organelle, metabolism, endosymbiosis
Resources: computer lab/Internet, Learn Genetics website:
http://learn.genetics.utah.edu/content/begin/cells/organelles/

Common learning experiences:

- Direct instruction in prokaryotic and eukaryotic molecular biology and biochemical composition.
- Teacher explanation of Gram staining use and importance
- Microscopic examination
- Do Nows
- Magnification calculation
- Sketching and describing microbes
- Internet research on the differences between prokaryotes and eukaryotes
- Laboratory techniques, including staining cells and culturing bacteria
- Debate on cell origins
- Reading and analyzing recent popular articles on cells and disease

Common assessments including the end of unit summative assessment:

- Microbe sketches
- Graphic organizers
- Gram stain results
- Magnification calculations
- Ability of demonstrate and apply aseptic technique
- Debate technique

Teacher notes:

- Students will require direct instruction and practice to view the correct images through microscopes
- Students will require practice to master each of the laboratory techniques, as they will be revisited throughout the course

Windsor Public Schools
Curriculum Map
Microbiology and Disease
BOE Approval Date

Purpose of the Course:
This course examines the world of microbes and disease. The prevention, transmission and diagnosis of various diseases are discussed as well as microbial structure, genetics, ecology, and evolution. Special attention is given to contemporary and historical health problems such as influenza, AIDS, Lyme disease, and salmonella poisoning. Lab experiences will include bacteriology techniques and microscopy.

Name of the Unit: Unit 2: Control of Microbial Growth	Length of the unit: 9 Blocks (86-minutes each)
Purpose of the Unit: Students will examine the parameters of microbial growth. They will also understand how to control the growth of microbes as well as the effect different factors have on microbial growth.	

State Standards Addressed in the unit:

CT Science Frameworks – 10.2 – Microorganisms have an essential role in life processes and cycles on Earth.

CT Science Frameworks – Enrichment Standards
The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. Prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure. Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings

Organisms have a variety of mechanisms to combat disease. There are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.

Big Ideas:	Essential Questions:
• Studying microbial growth can teach us about the biology of other organisms, including humans • In order to treat infection, we must know how to control the growth of microbes • Antibiotics control bacterial growth, but antibiotic resistance is spreading	• Why is it important to study microbial growth? • How can the growth of microbes be compared to the growth of other organisms? • How can we fight antibiotic resistance?

Students will know:	Students will be able to:
• Environmental factors that influence microbial growth and how these factors vary for different species • Various modes of action of specific antibiotics in preventing the growth of microorganisms • Evolution and spread of antibiotic resistant pathogens	• Test different chemicals for their ability to limit microbial growth • Measure rates of microbial growth • Analyze the ingredients of bacterial culture medium • Compare various physical and chemical methods used to control or prevent microbial growth • Describe how exposure to certain chemicals or radiation increase rates of heritable mutations in microorganisms

Significant task 1: Why Do Antibiotics Work And How Can We Test Their Effectiveness on Microbes?

Students will investigate in groups how different antibiotics affect different stock bacterial species. After a brief teacher-led introduction to antibiotics, including history of their discovery, and how bacteria are evolving to become resistant to them, student groups will be given antibiotic discs and will be asked to design a hypothesis and lab procedure that tests the effectiveness of antibiotics on at least two different species of stock bacterial cultures. Groups will conduct their experiments and record results. Students will individually formulate a scientific argument based on their results.

Based on class results, a class discussion addressing the question: "Why might we want to know how many bacteria there are in a microbial sample?" will ensue. Students will be introduced to a variety of ways to count the number of individual bacteria. Students will use sterile tubes of broth to make serial dilutions of colonies that have grown on their plates treated with antibiotics after being instructed by the teacher on how to do so. Using serial dilution technique, students will plate the final tube of broth. Each group will count the number of individual colonies that have grown and plot their number on a classroom bacterial growth chart. Each group will use mathematical analysis to figure out how many individual bacterial cells existed in their initial sample. Students will complete lab reports with emphasis on analyzing the serial dilution technique as more efficient for counting bacterial colonies as well as connecting the number of bacterial cells in a colony to the effectiveness of an antibiotic.

Groups will present their findings to the class in the form of PowerPoint, iMovie, story, or other mode of their choosing that outlines their hypothesis, procedure, results and conclusions on antibiotic effectiveness. Included in the presentations will be student explanations of at least 3 ways that antibiotics work to inhibit bacterial growth and based on this explanation, each group will be asked to explain and justify the action of one antibiotic that they tested.

Timeline: 5 blocks (86-minutes each)
Key vocabulary: exponential growth, serial dilution, antibiotic, inhibition, antibiotic resistance, bacterial colony
Resources: laboratory equipment, antibiotics, culture media, text notes, Internet sources, presentation software or other materials appropriate for student presentations

Significant task 2: Identifying Ways to Inhibit Bacterial Growth

Using think/pair/share students will hypothesize how each of a variety of different household and laboratory chemicals will affect the growth of different species of bacteria. Given a variety of laboratory equipment, students brainstorm in small groups how to best answer the question: "how can we study the effect chemicals have on microbial growth?" Student pairs will design and conduct an experiment to determine how best to test 3 different species from laboratory stock bacterial cultures and will choose at least 4 different chemicals to test on each of the species of bacteria. Students then discuss and write down different ways of measuring the outcomes of these experiments, and after the culture plates have been incubated for at least 24 hours, students will record their results on a chart of their own design. Class results (data tables, charts) will be posted to generate discussion and comparison among groups. Based on the class data, individuals will select a household cleaning product and design and present an advertisement persuading the audience of the best product to inhibit bacterial growth.

Timeline: 4 Blocks (86-minutes each)
Key vocabulary: chemical inhibition, bacterial growth, competition, adaptation, evolution, sterilization, inhibition of microbial reproduction
Resources: laboratory equipment, bacterial cultures, culture media, various household and laboratory chemicals, text notes, student groups

Common learning experiences:

- Do Nows
- Reading and analyzing recent popular articles on cells and disease
- Serial dilutions laboratory
- household chemical investigation
- antibiotics investigation
- written scientific arguments based on student-gathered lab data
- presentations on bacterial growth inhibition
- advertisement assignment that promotes the household cleaning product that best inhibits microbial growth

Common assessments including the end of unit summative assessment:

- bacterial growth quiz
- lab procedures and results notes
- laboratory reports
- lab presentations
- serial dilutions evaluation and analysis
- household chemical effectiveness advertisement

Teacher notes:

- For significant task 2, the general procedure with teacher help is to use aseptic technique to inoculate Petri plates with bacteria and then apply small paper disks that have been soaked in chemicals and apply them to the inoculated plates, so that each species is exposed to the same chemicals in order to compare their growth.

Windsor Public Schools
Curriculum Map
Microbiology and Disease
BOE Approval Date

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Name of the Unit: Unit 3: Molecular Mechanisms of Microbial Genetics	Length of the unit: 8 Blocks (86-minutes each)
Purpose of the Unit: Students will investigate molecular mechanisms involved in gene expression in microbes. They will explore how these mechanisms affect microbial evolution. Students will understand how various microbes reproduce and how genetic transfer impacts microbial evolution. They will also describe how genetic transfer in microbes can be utilized in biotechnological applications.	

State Standards Addressed in the unit:

CT Science Frameworks – 10.2 – Microorganisms have an essential role in life processes and cycles on Earth.

CT Science Frameworks – Enrichment Standards
The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. The central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm.

Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. Mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein.

The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells. Genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products. Exogenous DNA can be inserted into bacterial cells to alter their genetic makeup and support expression of new protein products.

Big Ideas:	Essential Questions:
• Prokaryotes reproduce and pass genes to their offspring differently from eukaryotes • Viruses cannot reproduce on their own • Biotechnology can be used to modify an organism's phenotype	• How are bacterial genetics similar and different from viral genetics? • How are bacterial genetics similar and different from eukaryotic genetics? • How do viruses reproduce?
Students will know: • The molecular basis for transcription, translation and DNA replication in prokaryotes and eukaryotes • How genetic transfer impacts microbial evolution • The molecular basis of biotechnology • The uses of biotechnology to engineer organisms for human needs	Students will be able to: • Describe how DNA rearrangements occur • in bacteria • Describe how genetic information is transferred between cells • Describe how microbes reproduce • Analyze how genetic transfer in microbes can be utilized in biotechnological applications • Describe how biotechnology is used insert genes that originated in one species into the genome of a another species

Significant task 1: Introduction to Viral and Bacterial Genetics

Students will individually create a viral and bacterial genetics portfolio of this significant task.

Student pairs will brainstorm characteristics of viruses and will share these characteristics in a whole-class discussion. Students will then be introduced to viruses and viral genetics for the first time in this course through a teacher-directed presentation. Students will compare their responses with what they have learned from the teacher's presentation and create a chart that includes misconceptions and the corrections to those misconceptions. The teacher will guide this chart building exercise to make sure misconceptions are adequately addressed. Using internet sources, each student will gather images that they will use to produce a full-color product of how viruses reproduce themselves. Individually, students will compose a written explanation accompanied by student-generated illustrations of how DNA works to carry the genetic message and the general way viruses can be used in genetic engineering. Students will research and present how genetic engineering with viruses is currently being used to help treat or cure a specific disease. Students will decide on their presentation format.

Students will be introduced to bacterial reproduction and genetics with a teacher-generated presentation. Using video clips, images and text sets, pairs of students will create a detailed and labeled diagram of bacterial reproductive cycles. Students will write an analysis of how the process of gene trading and reproduction by bacteria allow them to acquire antibiotic resistance.

Students will synthesize their understanding of bacterial and viral growth and reproduction on a graphic organizer, which will be included in their portfolio submission. In their analysis, students will apply their learning to the question of how bacteria continue to evolve and how we can apply this knowledge to evolutionary processes in all other species.

Timeline: 5 Blocks (86-minutes each)
Key vocabulary: DNA, RNA, transcription, translation, protein synthesis, genotype, phenotype, genetics, virus, lytic cycle, lysogenic cycle, transformation, transduction, conjugation

Resources: computer lab, internet resources, text notes

Significant task 2: Changing A Bacterial Phenotype Using Biotechnology

Students will be introduced by direct instruction to how biotechnology can be used to transform bacteria. Students will be given a laboratory procedure from the Bacterial Transformation Lab website and will then individually summarize the procedure in writing, including the independent variables and why each one is used in the experiment. Small groups of students will conduct the experiment and complete a formal lab report that includes an explanation of transformation of bacterial phenotypes using biotechnology.

Timeline: 3 Blocks (86-minutes each)
Key vocabulary: transformation, biotechnology, variable, pGLO, plasmid, genetic engineering
Resources:
http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20laboratory/bacterial%20transformation/bacteria.htm , lab notes, lab questions

Common learning experiences:

- Portfolio research and production
- Biotechnology laboratory investigation
- Do Nows
- Reading and analyzing recent popular articles on cells and disease
- Class discussion on antibiotic resistance

Common assessments including the end of unit summative assessment:

- Microbial genetics portfolio
- Central dogma of molecular biology quiz
- Genetic basis of antibiotic resistance quiz
- Biotechnology lab report

Teacher notes:

- For significant task 1, the chart of misconceptions about viruses will be the first part of the portfolio and must include an analysis of each of at least 3 corrections. The second portfolio assignment is a detailed diagram of the viral reproductive cycles. The third portfolio assignment is a written explanation accompanied by student-generated illustrations of how DNA works to carry the genetic message and the general way viruses can be used in genetic engineering. The fourth portfolio assignment is to solve a problem using genetic engineering. Students will have similar portfolio artifacts for bacterial growth and reproduction cycles. The final portfolio artifact should include a comparison of bacterial and viral life cycles.
- There are many different resources online for carrying out the pGLO plasmid transformation lab. The materials are ordered easily from BioRad, which has the best instructions and components for this particular lab exercise.

Windsor Public Schools
Curriculum Map
Microbiology and Disease
BOE Approval Date

Purpose of the Course:
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Name of the Unit: Unit 4: Pathogenic Relationships and Epidemiology	Length of the unit: 12 Blocks (86-minutes each)
Purpose of the Unit: Students will understand how diseases are spread. They will also investigate the role of the human immune system in fighting disease. Students will explore how epidemics and pandemics can be prevented. They will also debate whether or not dangerous pathogens should be engineered.	

State Standards Addressed in the unit:

CT Science Frameworks – 10.2 – Microorganisms have an essential role in life processes and cycles on Earth.

CT Science Frameworks – Enrichment Standards
Organisms have a variety of mechanisms to combat disease. The skin provides nonspecific defenses against infection. Antibodies have a role in the body's response to infection. Vaccination protects an individual from infectious diseases. There are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections. An individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign. Phagocytes, B-lymphocytes and T-lymphocytes have a role in the immune system.

Big Ideas:	Essential Questions:
• Infectious microbes are examples of symbiosis • The immune system is our best defense against pathogens	• How are diseases a continuum of host/symbiont interactions? • How do microbes contribute to good health and yet cause illness?
Students will know:	Students will be able to:
• Examples of pathogenic microorganisms and how they cause disease in plants and animals	• Relate Koch's postulates to identify disease-causing microbes

• The mechanisms by which communicable diseases are spread among individuals within a population • How genetic changes in pathogenic microbes (such as influenza virus) result in new outbreaks of disease	• Explain animal host defense mechanisms for combating microbial invaders, including both adaptive and innate immune systems

Significant task 1: How Are Infectious Diseases Spread and Studied? How Do Immune Systems Prevent Infection and Destroy Pathogens?

Students will be shown clips of *Disease Warriors* video and will answer written questions about these clips. A brief teacher-directed class discussion will take place focusing on the study and spread of diseases, paying special attention to how vaccination prevents infectious disease. Students will study the original epidemiologist John Snow in a brief teacher-directed PowerPoint introduction to the cholera outbreaks of mid-19th century London. Using the internet, students will write a brief description of how this pioneering epidemiologist identified how cholera was being spread and what he did about it. Students will then be given instructions for the role-playing game *Following a Simulated Epidemic* and will carry out the simulation while recording results on an accompanying chart.

Students will be introduced to HIV infection and AIDS with a prior knowledge questionnaire and brief whole class discussion based on their answers. Using internet sources, students will diagram and label the stages of HIV infection in color. In a teacher-directed presentation, students will be introduced to the immune system with a focus on vocabulary and relationships of cell-mediated immunity and humoral immunity. Students will produce a schematic diagram of the relationship of these two systems using teacher-selected diagrams and readings, paying special attention to how vaccines prime the immune system to react to infectious pathogens. Individual students will then apply what they have learned in the writing of a short explanation of how HIV gets around the various defenses of the acquired immune system and why vaccines against HIV are so difficult to produce (this explanation will include the vocabulary students have learned from their studies in this task.) Students in small groups will read and provide at least one detailed solution and analysis of that solution to the case study Immunological Malfunction? or Case of the Mysterious Infection

Timeline: 6 Blocks (86-minutes each)
Key vocabulary: AIDS, HIV, infection, pathogen, epidemic, pandemic, epidemiology, acquired immune system
Resources: case study links (http://sciencecases.lib.buffalo.edu/cs/), role-playing game handouts, text sets, video clips

Significant task 2: Prevention of Epidemics and Pandemics

In pairs, using the internet, students will gather, analyze and evaluate information about prevention efforts against a particular infectious disease (each pair will be given a different disease). Students will explain how the disease is spread, what parts of the world in which it is found, what efforts are being made to prevent infection, and who is most susceptible to the disease. Students will evaluate these efforts, using evidence and comparing different solutions to fighting the disease. They will provide a justification for the best way they believe to prevent this disease after explaining different possible preventive actions. This information will be summarized on flip chart paper and posted around the classroom for all students to participate in a gallery walk of the various diseases. Students will record

information on a graphic organizer or in their notebooks as they learn about each disease.

The class will be randomly divided into 2 groups. One group will be pro-vaccination and the other group will be anti-vaccination. Using the case study *Eradicating Smallpox* as a guide, each group will format a series of at least 12 talking points for their position. Each group will also formulate 4 one-sentence questions to ask the opposing group during the debate. The format of the debate will allow each group to present a talking point for 2 minutes and when they are finished the other group will have 1 minute for rebuttal. Then the talking point will revert to the other group. After the point/counterpoint segment, each group will have an opportunity to ask their questions. The group being questioned will have 2 minutes to answer, and then it will be their turn to ask a question. Individual students will be evaluated by how well they are able to argue in writing which group won the debate.

Timeline: 4 Blocks (86-minute each)
Key vocabulary: epidemic, pandemic, vaccination, debate
Resources: internet sources, text sets, http://sciencecases.lib.buffalo.edu/cs/

Significant task 3: Should We Engineer Dangerous Pathogens?

Students will be shown the Nova Science Now clip on reviving the 1918 Influenza Virus. Students will then read a New York Times article about the debate over making the bird flu virus more virulent and a choice of articles that focus on the debate and the controversy about these experiments. Students will take notes on both the video and the article and then each student will produce a series of 8 questions that they will trade with one other student and each will answer the other's questions in writing. Each student will produce a short presentation where they argue for or against this research.

Timeline: 2 Blocks (86-minutes each)
Key vocabulary: flu, smallpox, virulent, biohazard,
Resources: video clip, newspaper articles, NIH website, http://www.diseasedetectives.org/links

Common Learning Experiences:

- Do Nows
- Reading and discussion about recent bubonic plague outbreak
- the role of the Centers for Disease Control teacher-led presentation
- epidemic role-playing game
- immune system portfolio
- diseases prevention research
- vaccination debate
- bio-engineering pathogens for study

Common assessments including the end of unit summative assessment:

- immune system portfolio
- answers to questions about role-playing game
- performance in vaccination debate
- HIV/AIDS formative and summative quizzes
- bio-engineering pathogens for study presentation

Teacher notes:

- For significant task 1, *Following a Simulated Epidemic*, the student handout available on shared folder. Teacher pre-lab prep time is required.

Windsor Public Schools
Curriculum Map
Microbiology and Disease
BOE Approval Date

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Name of the Unit: Unit 5: Original Scientific Investigation in Microbiology	Length of the unit: 9 Blocks (86-minutes each)
Purpose of the Unit: Students will become scientists who explore an original scientific investigation from start to finish, using appropriate tools, techniques, prior knowledge of subject, and collaborative skills, all within the parameters of microbiological study. Students will also explore various careers in microbiology and the tools and techniques associated with those careers.	

State Standards Addressed in the unit:
CT Science Frameworks – 10.2 – Microorganisms have an essential role in life processes and cycles on Earth. CT Science Frameworks – Scientific Inquiry, Literacy, and Numeracy Identify questions that can be answered through scientific investigation. Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment. Design and conduct appropriate types of scientific investigations to answer different questions. Identify independent and dependent variables, including those that are kept constant and those used as controls. Use appropriate tools and techniques to make observations and gather data. Assess the reliability of the data that was generated in the investigation.

Big Ideas:	Essential Questions:
• The science of microbiology is a process • Microbiological experiments and the scientific conclusions based on these experiments are creative and original	• Why might the results of an experiment lead different researchers to reach different conclusions? • How can researchers with different ideas collaborate productively?
Students will know:	Students will be able to:
• Whether conclusions are reasonable by reviewing the process and checking against	• Suggest reasonable hypotheses for identified problems

other available information • How to use systematic procedures for recording and organizing information • How to use technology to produce tables and graphs	• Develop procedures for solving scientific problems • Collect, organize and record appropriate data • Develop reasonable conclusions based on data collected • Use technology to develop, test, and revise experimental or mathematical models • Apply a variety of microbiology lab skills and techniques

Significant task 1: Design and Conduct an Original Scientific Investigation

Students will begin this unit by choosing to work within a group of not more than 3 individuals. Students will design and outline in writing an original scientific lab investigation based on the model of experiments they have already performed. The groups use the teacher-generated assignment sheet in order to fulfill the requirements of preparation before their experiment can be approved. Groups use the internet to research experiments similar to the ones that they want to carry out. Acceptable experiments will be based on environmental constraints on bacterial growth and reproduction. Students must be able to carry out their experiment in the science lab using standard equipment and bacterial strains from scientific supply companies. In order to meet teacher approval to begin their experiment they need to have a formal written proposal that includes: reason for choosing this avenue of research, hypotheses about the outcome, how they will carry out the procedure, materials they will need, and citations of similar experiments and details of the results of those experiments.

Groups can take up to 3 blocks to finish their procedure and collect their results.
Groups will design a presentation that communicates their hypothesis, procedure, results, analysis of their results and final conclusion. Each individual student will write a scientific paper that communicates their hypothesis, procedure, results, analysis of their results and final conclusion.

Timeline: 7 Blocks (84-minutes each)
Key vocabulary: hypothesis, variable, procedure, results, conclusion, citation
Resources: laboratory equipment, internet research, past laboratory investigations

Significant task 2: How Do Microbiology Professionals Use the Tools of the Trade?

Students will research a career in microbiology. Each student will analyze in writing how their chosen profession uses at least 6 of the tools and techniques that students have used and learned about in this course. Each student will present their chosen profession, including how these microbiologists use tools and techniques. Professions that are appropriate to research include: bacteriologists, virologists, epidemiologists, medical technologist, diagnostic laboratory microbiologist, immunologists, medical doctors, veterinarians, public health workers, waste and wastewater management, biotechnology, oil and gas industry, pharmaceuticals, vaccine researcher, cosmetics industry, brewers.

Timeline: 2 Blocks (86-minutes each)
Key vocabulary: various
Resources: internet, text sets

Common learning experiences:

- Original scientific investigation
- Portfolio synthesis

Common assessments including the end of unit summative assessment:

- Lab report on research investigation
- Presentation of research investigation
- Final portfolio

Teacher notes:

- Instructor must decide if the student project is 'doable' in the lab in 3 blocks, and does not require them to sample unknown microbes from the environment.

Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5 Reading

Name of the Unit: Unit 1 Agency and Independence: Launching Reading with Experienced Readers	Length of the Unit: 5 weeks

Purpose of the Unit: The purpose of this unit for fifth grade students is to send the message that they already have essential skills, strategies and behaviors as readers and they will be asked to draw upon those strategies as they move forward in their continuum of reading. They know how to choose books they can read with ease; they pay attention to characters and to story elements in the stories they read; and they envision, predict, develop theories, and think across books as they read. They also monitor for comprehension, and they have a repertoire of strategies to use when a book gets hard. Instruction will help students continue their literacy community from last year around a shared love of books and will build towards text complexity. The final purpose of this unit is for students to begin to build cohesion and understanding around questioning and develop theories around text using posit-its or in their notebooks, and to reflect on what an effective partnership looks and sounds like and how having conversations around texts affect readers.

Common Core State Standards Addressed in the unit:

RL.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.5.2 Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.

RL.5.3 Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).

RL.5.4 Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes.

RL.5.10 By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently.

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

SL.5.1a Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

SL.5.1b Follow agreed-upon rules for discussions and carry out assigned roles.

SL.5.1c Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.

SL.5.1d Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.5.3 Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.

SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

RF.5.3 Know and apply grade-level phonics and word analysis skills in decoding words.

RF.5.3a Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.

RF.5.4 Read with sufficient accuracy and fluency to support comprehension.

RF.5.4a Read grade-level text with purpose and understanding.

RF.5.4b Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings.

RF.5.4c Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

Big Ideas:	Essential Questions:
▪ Readers have a repertoire of strategies that they apply to their daily reading based on the text in front of them. ▪ Readers understand that discussing what they read with others will deepen their comprehension as well as provide them with others perspectives about life. ▪ Readers use their repertoire of skills in other content areas.	▪ Using what you already know about yourself as a reader, what are your goals as a reader? ▪ How does having conversations around texts affect readers? ▪ How can reading skills be transferred to other content areas? ▪ How can you continue to make reading a big part of your life?
Students will know:	Students will be able to:
▪ what supporting details and specific examples are ▪ the elements of a summary	▪ refer to supporting details and specific examples in text ▪ summarize text

▪ theme is the message in a story ▪ the same theme can apply to many texts ▪ strategies for determining meaning of unknown words ▪ talking about books helps comprehension	▪ determine theme from details ▪ determine the meaning of words and phrases ▪ read and comprehend literature in the grades 4-5 text complexity band ▪ discuss text with a partner

Significant task 1: Readers Develop Agency to Lift Their Reading Lives – Creating Reading Resolutions, Finding Just-Right Books, Reading Faster, Stronger, Longer, and Awakening Ourselves to Texts

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

In significant task 1, teachers and students work together to create an environment that fosters a love of reading and thinking. Students should be asked to think back on times when reading was the best it could be for them and when it was an unfulfilling reading experience and then reflect on what made each of those times one way or the other. Students will then create reading resolutions for themselves that draw on their experiences. Students will engage in whole class discussions that highlight the focus for the first month. Students answer questions such as, "What was it about that one reading time that made reading work for you?" and "How can we be sure that reading is just as magical in the year ahead?" It is essential that as part of this task, students feel a sense of ownership of their reading lives. Students will work to self-select just-right books with teacher guidance.

Students will begin to use reading tools. They will create a Reading Life Portfolio including a reading log, reader's notebook, and other materials. Students will receive specific instruction on ways to grow as readers and set personal goals. The class will also set class goals. Students will learn how to engage in reading, focusing on things like expression, tone, and using Post-Its to record their thinking. As they read closely, students will gather evidence from text on Post-Its which they will use to have conversations with partners.

By the end of this task, students should be taking control of their reading lives, thinking about their reading identities, tucking into books they love and reading these with passion.

As part of significant task 1, teachers should work with students to establish partnerships. Partner talk is important because it gives students reasons to develop ideas, to gather text details, to practice paraphrasing and summarizing. Teachers should allow students to describe who they are as readers on an 8 ½" x 11" piece of paper and post these so that students get to know one another as readers. Students can then choose 2 or 3 classmates to interview as potential partners and finally, write to the teacher telling who they would like to have as a reading partner and why. When choosing partners, students will learn that partners pay attention to each other's reading histories, reading interests, and reading hopes, as well as to the kind of intellectual work they do with texts. As students begin to work together in partnerships, they will set goals and choose the work they will do together. Partners may begin

by talking about parts of the text that called their attention. Partners may also retell what has happened so far and what may happen next or they may summarize the story.

Product:
Individual reading goals set by students that will drive their purpose for reading. The teacher will encourage students to reflect on their goals which should include partner work.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.2, RL.5.3, RL.5.10, SL.5.1, SL.5.2, SL.5.3, RF.5.4

Timeline: 8 days

Key vocabulary: resolutions, independence, fluency, envision, synthesize, accountable to the text, summary, monitor, awareness, reading identity, partnerships

Resources:

- Independent reading books on the students' levels in book bags (should be used in Significant task 1 and everyday thereafter)
- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit One – Agency and Independence: Launching Reading with Experienced Readers
- Reading Life Portfolios including: reading log, reader's notebook, reading tools (should be used in Significant task 1 and everyday thereafter)

Significant task 2: Reading Between the Lines and Coauthoring the Text

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

Significant task 2 builds upon the work of selecting "just-right" books from task 1 and emphasizes the importance of close reading and holding onto the story. Students will apply the thinking about texts to increasingly complex texts as they weigh levels of meaning, structure, language conventionality and knowledge demands. Students build mental movies while reading which helps them to monitor for understanding, thus increasing comprehension.

Students will create their own personal toolkit of reading strategies, so that when they encounter difficulty, they have a range of ways to get their reading back on track. Students learn that:

1. Readers read for subtext as well as for text, at the start of a story working really hard to read between the lines, imagining what the details suggest, or imply about the characters or about the place.
2. Readers have to pause and create vivid images, releasing our imaginations, paying attention to details and filling in with more imagined sights, sounds and atmosphere, envisioning the moment as a scene in a film.
3. Readers are alert to shifts in time and place, imagining the moments in between the scenes that are written, paying attention to setting clues to see if time has passed or the

setting has changed.
4. Readers pay attention to references to other parts of the book, see the meaningful connections between parts of a story, earlier events, earlier parts or even something in another book in a series.
5. Readers have and use a repertoire of strategies we already know to work through difficulty.

Other strategies include:
Readers keep reading, thinking, "What's going on here?"
Readers need to go back and reread to see if they missed something.
Readers may also slow down and look carefully at the details in the text.
Readers also use strategies for determining the meaning of unknown words and phrases as they are used in a text.

In this task, students learn not only to read well, but also how to love reading. They learn that it is we who choose our relationship with a text, so they feel optimistic as they build a reading life. Throughout this task, students should reflect and recall what they've been learning, and spend some time noticing how, why, and when they are transferring and applying their new, stronger skills.

Products:
Students create their own personal toolkit of reading strategies in their readers notebooks.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.2, RL.5.4, RL.5.10, SL.5.1, SL.5.2, SL.5.3

Timeline: 8 days

Key vocabulary: independence, fluency, envision, synthesize, accountable to the text, summary, monitor, awareness, reading identity, close reading, subtext, between the lines, suggest/imply

Resources:
- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit One – Building a Reading Life

Significant task 3: The Art of Literary Conversation

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

Significant task 3 continues the work of partnerships started in significant task 1. Students learn that they can foster relationships with one another over books, and that they can hold conversations that will comb through their reading lives. Students will share texts, and hold conversations with partners that mirror and extend the internal conversations we want students

to have with themselves as they read.

Some of the work of partnerships in this task will focus on summarizing texts. Students will describe what parts feel important and why. Students may also share how they felt and what they thought about events in the text.

Additional work in partnerships will focus on retelling. When emphasizing retelling, remember that this level of comprehension is necessary and significant, yet absolutely not sufficient on its own for success in reading. Students must be moved from a literal moment by moment retelling, to something more analytical. Therefore depending on students' experience and expertise the teacher may choose which types of retellings to work on with students. The teacher should differentiate the type of retelling work depending on students' needs. Retellings may include character-based retellings, synthesized retellings, and retellings with parenthetical comments.

Students will learn the behaviors necessary for effective partnerships. For example, students will learn to be still when someone is speaking, to allow time for partners to share all thoughts, to nod their heads to show they understand, and to ask questions when they are confused.

Finally, the class will celebrate the rich work they did across the month. Students will think back on the unit, recalling memories they want to hold onto forever. To do this, students will look back through logs and post-its and think back on the read-aloud, their conversations with partners and their independent reading books. Then they can talk with a partner, discussing how they have changed and what they want to remember as they continue to read. Next, students will think about the big discoveries they made about themselves as they read during this unit. After a few minutes of discussion, children can write down what they want to hold onto, recording their memories and their hopes on paper so they are not fleeting. A few children will share what they wrote with the class to end the celebration.

Products:
Students will write a written response to the following questions: 1. How does having conversations around texts affect readers? 2. Describe what an effective partnership looks and sounds like.

Students will complete written summaries in their reader's notebooks.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.2, RL.5.10, SL.5.4, RF.5.3, RF.5.4

Timeline: 4 days

Key vocabulary: resolutions, independence, fluency, envision, synthesize, accountable to the text, summary, monitor, awareness, reading identity, retell

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit One – Agency and Independence: Launching Reading with Experienced Readers

Common learning experiences:

- Suggested text for close reading: *Edward's Eyes* by Patricia MacLachlan*, Bridge to Terabithia* by Katherine Paterson
- Suggested short stories: *Every Living Thing* by Cynthia Rylant
- Read-alouds used in this unit should be similar in complexity to *Bridge to Terabithia*.

Common assessments including the end of unit summative assessment:

- At minimum, a Teachers College Reading and Writing Project running record (TCRR) on each student's independent reading level should be completed in September and at least one additional time each term. Additional TCRRs can be done at any time.
- Anecdotal notes on reading behaviors, talk during conferences and partner talk
- Reading conferences following the research, compliment, teach sequence
- Analysis of post-it notes and reading responses
- Analysis of reading logs

Teacher notes:

- At the beginning of the year, it is a challenge to get all the essentials up and running immediately. Kids often lose ground over the summer because they are not reading a high volume of appropriate books and so the most important goal is to not waste a minute before getting students reading lots and lots of books.
- Conversations with last year's teachers will determine what structures students are accustomed to, so these will not be re-taught, but rather re-enforced.
- *Building a Reading Life* from Units of Study on Teaching Reading grades 3-5 is a great resource for this unit.
- In third and fourth grade, students were asked to: find just-right books, create goals for themselves as readers, use strategies when text is difficult, talk with a reading partner daily and write in response to something of importance.
- At the beginning of the year, focus on the classroom environment. Consider: how you set up a literacy rich classroom; how you organize your classroom library; how you make charts to meet the needs of all students; how you scaffold and review skills and lesson from previous years while building on this year's work; how you make your meeting area a purposeful place and establish routines and rituals for coming to the meeting area.
- Interactive read-alouds should be engaging and provide students with the opportunity to hear challenging texts read aloud. Read-alouds can occur during many parts of the day.
- During Interactive Read-alouds, model thinking by "think alouds" and provide students the opportunity to be engaged in the text with "turn and talks" and "stop and jots" (at least 3 turn and talks ; 1 stop and jot)
- Ask students to use text based support in their discussions
- Consider providing students with purposeful graphic organizers that can be used in small groups or individual conferences. These graphic organizers might begin to organize students in reading across a text or making meaning of a phrase.

Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5 Reading

Name of the Unit: Unit 2 Following Characters into Meaning: Envision, Predict, Synthesize, Infer, and Interpret	Length of the Unit: 5 weeks
Purpose of the Unit: The purpose of this unit is to push students to apply what they already know about reading with increased independence and a growing sense of repertoire. This unit focuses on developing higher level comprehension skills. In this unit, students will not only think about characters in one book, but across many books. The unit asks students to compare and contrast characters across books to deepen understanding of characters (and people), and to help their theories grow in complexity. At the same time in writer's workshop, the children will apply all they learn in reading to the writing of fiction – all of their work in analyzing and interpreting characters and stories will support theses they have developed on their own.	

Common Core State Standards Addressed in the unit:

RL.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.5.2 Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.

RL.5.3 Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).

RL.5.6 Describe how a narrator's or speaker's point of view influences how events are described.

RL.5.9 Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics.

RL.5.10 By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research

W.5.9a Apply *grade 5 Reading standards* to literature (e.g., "Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text [e.g., how characters interact]").

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

SL.5.1a Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.

SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

L.5.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.

L.5.3a Expand, combine, and reduce sentences for meaning, reader/listener interest, and style.

Big Ideas:	Essential Questions:
▪ When inferring from and interpreting characters, readers will gather evidence from across a text, sorting the most relevant evidence, and analyzing this evidence in support of their ideas. ▪ Reading well involves pulling the pieces of a text together so that when something happens midway through a story, it doesn't happen out of thin air. The reader can see the causes for that event, the event almost seems inevitable.	▪ What do you know or can you infer about specific characters using evidence from the text? ▪ Using evidence from the text, what predictions can be made? ▪ When events happen midway through a story, what did the author do to foreshadow that event?
Students will know: ▪ what supporting details and specific examples are in text ▪ what it means to compare and contrast ▪ what theme is ▪ setting and events are important elements in texts	Students will be able to: ▪ refer to supporting details and specific examples in text ▪ compare and contrast two or more characters ▪ compare and contrast two or more settings ▪ compare and contrast two or more events ▪ compare and contrast stories in the same genre ▪ read and comprehend literature at the high end of grades 4-5 text complexity band ▪ accurately quote from text ▪ determine theme to include how characters respond to challenges

Significant task 1: Envision, Prediction, and Inference

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/small group work with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

Significant task one asks students to dive head first into the worlds of the books they are reading. At the beginning of the unit, there is an increasing emphasis on helping students to accurately quote and draw on textual evidence, in the form of specific details and examples, to support their ideas about characters' motivations. They will be asked to engage in deeper self-reflection and self-analysis by keeping Post-its or notebook entries. In significant task one, students work primarily on envisioning and predicting. In this task, students will be working in groups, pairs, and individually to develop a deeper understanding of texts.

Products:
Reader's notebook entries including specific details and evidence about characters. Readers will revise their thoughts about characters as they read on and gain more information.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.3, RL.5.10, W.5.9, W.5.9a, SL.5.1, SL.5.1a, SL.5.4, L.5.3

Timeline: 5 days

Key vocabulary: envision, scene, trait, theory, evidence, evaluate, analysis, motivation, empathy, relationship, metaphor, simile, persistent, tenacious, resourceful, glum, generous, encouraging, loyal, patient, intolerant, snide, jealous, malicious, emotion, pattern, event, storyline, setting, mood, figurative language, dialogue, interpretation, theme

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit Two – Following Characters into Meaning, Literature Reading Continuum, Readers Notebooks

Significant task 2: Building Theories about Characters

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

In significant task two, students will notice characters' personality quirks, habits, and how they respond to events inferring to develop ideas about characters' traits, motivations, troubles, changes, and lessons. As students collect entries in their notebooks, they will use academic

language associated with characters (such as trait, pattern, mood) and have the opportunity to reflect on questions like: "Why did the character do that?" and "Do you think he/she did the right thing?" These inquiries support students in developing ideas about their characters and analyzing the text in support of these ideas, rather than just retelling what happened in their books. Students will think deeply and with nuance about characters—considering what a character holds close, that character's complexities, how characters change, when characters act "out of character", the way that secondary characters act as mirrors of main characters—to help them develop inferences, interpretations, and grow in their abilities to talk and write well about reading. In addition to analyzing characters across a single text, students will also compare and contrast characters from multiple texts.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.3, RL.5.9, RL.5.10, W.5.9, W.5.9a, SL.5.1, SL.5.1a, SL.5.4, L.5.3, L.5.3a

Timeline: 12 days

Key vocabulary: envision, scene, trait, theory, evidence, evaluate, analysis, motivation, empathy, relationship, metaphor, simile, persistent, tenacious, resourceful, glum, generous, encouraging, loyal, patient, intolerant, snide, jealous, malicious, emotion, pattern, event, storyline, setting, mood, figurative language, dialogue, interpretation, theme

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit Two – Following Characters into Meaning, Literature Reading Continuum, Readers Notebooks

Significant task 3: From Inference Toward Interpretation

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

Significant task three will focus on interpretation work, with children shifting from inferring about characters to sustaining and supporting theories about them. The goal here will be that children's theories build in complexity and in richness of evidence. Children will be asked to speak with partners and apply prediction skills, building not only on their sense of how stories tend to go, but also of how this particular story is unfolding, and on all they know about a particular character. They will sometimes have to revise their predictions—or grow new ones—based on new information they learn as they read on. Students will learn that good books are about more than one idea, and that there are lessons that both the character and reader learn. Lastly, they will reflect on the work they've done, using strategies learned to theorize about themselves as readers and to theorize about their characters.

Products:
Students will develop a collection of theories about characters in their reader's notebooks.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.2, RL.5.3, RL.5.6, RL.5.9, RL.5.10, W.5.9, W.5.9a, SL.5.1, SL.5.1a, SL.5.4, L.5.3

Timeline: 8 days

Key vocabulary: envision, scene, trait, theory, evidence, evaluate, analysis, motivation, empathy, relationship, metaphor, simile, persistent, tenacious, resourceful, glum, generous, encouraging, loyal, patient, intolerant, snide, jealous, malicious, emotion, pattern, event, storyline, setting, mood, figurative language, dialogue, interpretation, theme

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit Two – Following Characters into Meaning, Literature Reading Continuum, Readers Notebooks

Common learning experiences:

- Some predictable strategy groups might be: Readers monitor as they read, focusing on when they stop to think about important information being given about a character, to think and look deeper into a character's story. This could occur through a conversation between characters, or figurative language around a character. Readers can also use their Post-its to assess their comprehension. They can look at their Post-its in relation to the continuum to determine where they fall and how they can move to the next level, reflecting on themselves as readers.

- *The Tiger Rising* by Kate DiCamillo is a suggested read aloud for this unit. If you choose not to use this, find a text that is in the 4-5 text complexity band, that has some figurative language, richly portrayed characters that change over time, and more than one plot line.
- As part of this unit, teachers should have students analyze their reading responses and mentor responses to determine what makes strong responses to reading. Consider creating a rubric with students that is clearly displayed so that students can constantly reflect on their own work and progress.
- Throughout this unit the class should engage in grand conversations as a way to support partner conversations on grade level complex texts. The teacher can provide scaffolding that will support students in growing a conversation by sticking to an idea or two.
- Post or provide charts with important words and phrases to describe characters traits and emotions
- Students should meet with reading partners for five minutes or so every day at the end of reader's workshop.
- Teach partners the language they need to have conversations. Include the phrases on a chart which students can reference.
- Volume in reading – the number of books we expect students to read in a week is different based on their current level. N/O/P/Q readers will be reading two to four books a week. R/S/T readers will be reading one to two books per week depending on the length. U and V readers will likely read a book a week.

Common assessments including the end of unit summative assessment:

- Teachers should conduct an initial formative assessment, establishing a base-line for the skills each student brings to the unit. The same process should be repeated at the end of the unit as a summative assessment. During a read aloud-stop at preplanned places to ask questions. You might ask, "What ideas are you having about the character so far? Be sure to not only jot your ideas, but also evidence from the text." And later, "Have your ideas changed? Stop and jot." Design each question carefully, establishing a situation in which you can assess the children's ability to infer, synthesize, revise inferences and interpret. You'll want to be sure to remind children that textual evidence matters, and hold them accountable to not only formulating an idea, but backing it up with key details from a text. The *Literature Reading Continuum* can be used to help assess students' work.
- At minimum, a Teachers College Reading and Writing Project running record (TCRR) on each student's independent reading level should be completed in September and at least one additional time each term. Additional TCRRs can be done at any time.
- Anecdotal notes on reading behaviors, talk and writing
- Reading conferences following the research, compliment, teach sequence
- Analysis of post-it notes, reader's notebooks and partner conversations
- Analysis of reading logs

Teacher notes:

- In fourth grade, students are asked to describe characters, grow new theories, identify themes, and ask and answer questions, referring explicitly to the text to support answers.
- Fourth graders also step into their character's shoes so as to glean a more thoughtful understanding of characters, growing theories and altering them according to new information
- Work in this unit will help students to infer and then interpret characters, thinking about their motivations, traits, and feelings.
- As an optional resource, the books *Following Characters into meaning (Volumes 1 and 2)* from the *Units of Study* series support the work of this unit.
- Students should be reading primarily realistic fiction during this unit.
- During this unit teachers should consider if students are ready to move up a level in their independent reading.

Windsor Public Schools
Curriculum Map for the Elementary Level
Grade 5 Science/ELA

Unit 3 –Reading Informational Texts (Light and Sound)	Length of the unit: 4 Weeks

Purpose of the Unit: This unit takes the concepts of light and sound and allows students to explore their many facets. Students build on their inquiry experiences as budding scientist and extend the concepts to learn various practical applications and modern issues as they relate to light and sound. As readers and writers students reinforce reading for explicit information, making inferences, and summarizing what they have learned both orally and in writing. Students build and develop academic vocabularies that are integrated into discussion and written work.

Common Core State Standards Addressed in the unit:

CT Science Standard 5.1 – Sound and light are forms of energy.

Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. R.I.5.1

Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. R.I.5.2

Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. R.I.5.3

Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. 5.I.5.6

Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. R.I.5.9

Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. W.5.8

Draw evidence from informational texts to support analysis, reflection, and research. W.5.9

Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. SL.5.1

<table>
<tr><td colspan="2">Summarize a written text read aloud or information presented in diverse media formats, including visually, quantitatively, and orally. SL.5.2</td></tr>
<tr><td>Big Ideas: Energy Transfer and Transformations
Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects.
Light is a form of energy that travels in a straight line and can be reflected by a mirror, refracted by a lens, or absorbed by objects.
Readers confirm information with multiple resources.</td><td>Essential Questions:
What is the role of energy in our world?
What makes sound a unique form of energy?
Why do different materials reflect, refract or absorb light?
How do we verify what we’re experiencing and learning?</td></tr>
<tr><td>Students will know:
There are a variety of sounds in our environment. Sounds have characteristics, such as loudness, pitch and quality (or “timbre”), that allow them to be identified.
For sound to occur, there must be a vibrating object, a material through which the vibrations are transferred (for example, air or water), and a receiver (for example, an ear) to perceive the sound.
Objects can be caused to vibrate by actions such as striking, strumming, bowing, plucking or blowing.
Sounds can vary in loudness (“volume”). Volume is affected by the strength of the force causing the vibration. For example, striking a drum forcefully or gently produces sounds with different volumes.
Sounds can have a high or low tone (“pitch”). The pitch of a sound depends on the speed of the vibration. Objects that vibrate quickly have a high pitch, while those that vibrate slowly have a low pitch.</td><td>Students will be able to:
Generalize that vibrating objects produce sound if the vibrations are transferred from the object through another material (e.g., air, a solid, or a liquid).
Demonstrate how the loudness, pitch and quality/timbre of sound can be varied.
Design and conduct investigations to determine factors that affect pitch.
Describe the properties of materials that reflect or absorb sound.
Analyze properties of materials that cause sound to be reflected or absorbed, then apply findings to design a device that reflects or absorbs sound.
Construct simple musical instruments (e.g., rubber band guitars, drums, etc.) that produce sounds with various pitches, volume and timbres.
Provide evidence that light travels in straight lines away from a source in all directions.
Investigate how light is refracted as it passes through a lens or through one transparent material to another.
Demonstrate that white light is composed</td></tr>
</table>

▪ Pitch is affected by characteristics such as the shape, length, tension or thickness of the vibrating material (for example, the vibrating material may be a string, a glass, a wire or a drum). ▪ Sound travels (is "transmitted") through materials by causing them to vibrate. Sound is not transmitted if there are no materials to vibrate. Solids, liquids and gases (air) transmit sound differently. ▪ Sounds can be reflected or absorbed, depending on the properties of the material it hits. Sound tends to bounce off smooth, hard surfaces, producing an echo; sound tends to be absorbed by soft, porous surfaces, producing a muffled sound. ▪ Light travels in straight paths away from a source of illumination in all directions until it hits an object. Some sources of illumination produce their own light (for example, the sun, fire, light bulb); other sources of illumination reflect light produced by something else (for example, the moon or a mirror). ▪ Light interacts with objects in various ways; it can be reflected off the object, absorbed by the object, or refracted through the object. ▪ Materials can be classified based on how much light passes through them. Transparent materials allow most light to pass through them. Translucent materials allow some light to pass through them. Opaque materials do not allow any light to pass through them. ▪ Objects that have flat, smooth surfaces reflect light and produce a mirror-like image. Objects that have curved or	of many colors. ▪ Explain that all visible objects are reflecting some light to the human eye. ▪ Contrast the way light is reflected by a smooth, shiny object (e.g., mirror or pool of water) and how light is reflected by other objects. ▪ Measure angles to predict the path of light reflected by a mirror. ▪ Determine whether a material is opaque, transparent or translucent based on how light passes through it. ▪ Design and conduct light absorption experiments that vary the size, length, direction and clarity of a shadow by changing the position of the light-blocking object or the light source. ▪ Summarize information and make inferences about information in scientific/historical texts. ▪ Support information with evidence from a variety of learning experiences. ▪ Use academic language accurately. ▪ Analyze and compare information from multiple sources. ▪ Integrate knowledge from multiple sources. ▪ Take new learning and apply it to modern and potential future issues.

uneven surfaces scatter the reflected light and produce distorted or blurry images. ▪ Light always reflects away from a mirror at the same angle that it hits the mirror. The angle of incoming light equals the angle of reflected light. ▪ Objects that block light traveling from a source produce shadows. The shape, length, direction and clarity of a shadow depend on the shape and position of the object, and the location of the light source. ▪ Light changes direction ("refracts") as it passes from one transparent material to another (for example, as it passes from air to water or through lenses. ▪ Readers confirm information received from multiple sources. ▪ Readers use everything they know to draw conclusions. 1. Readers apply their learning in novel ways.	

Significant task 1:

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

Independent reading may or may not be supplemented with "just right" content-aligned texts when appropriate or available throughout the unit. Skills that require emphasis and that cannot be done on independent level texts are emphasized through guided practice on a grade level appropriate texts through independent and small group conferences. Small group work and individual reading conferences are tailored to meet the differentiated needs of students based on the standards taught throughout the unit.

In whole group, students engage in a teacher-led inquiry lesson where students learn about how

sound travels and factors that affect the loudness, pitch, and quality/timbre of sound. Each inquiry lesson follows the same initial pattern. Students are led through hands on activities and then participate as a whole class in answering reflective/Socratic questions. Following each discussion students then work in partnerships/small groups to conduct another hands on activity related to the whole class activity and lesson objective. Students write journal entries and summarize each experience. Following each activity teachers engage students in mini lesson instruction that reminds students that 21st Century scientist use information to confirm what they are thinking from the hands on activities. Students receive instruction in locating information quickly to answer questions. Teachers model how students use text features to help find information. Students receive lessons in table of content, text feature, headings, etc.

After building common knowledge about the basics of sound, students rotate through three stations to explore the variable that influences the pitch of a sound. In small groups, students manipulate variables that influence the volume of a sound (amplitude). Following the station work, students explore an online simulation of the properties of sound, such as http://phet.colorado.edu/en/simulation/sound or BrainPop Jr. For each investigation, students record observations and conclusions in their journals and provide feedback on journal entries to peers.

To extend and enhance the learning the teacher uses a text set of articles related to modern day issues involving sound like the "teenager repellant" used by shopkeepers in Europe. Through whole class instruction model how readers determine what the text says explicitly and what inferences can be drawn. Students read articles for central ideas and key details used to support arguments.

As an assessment student use factual information learned from texts and various learning experiences to make inferences about the practical application of light and sound society. Students read texts independently and with partners, summarize the ideas and make inferences both orally and in their science notebooks. Students respond in the science notebooks to, *"Based on all you've now learned and experience, what's a novel way in which we might see light and sound used in society?"*

Timeline: 4-5 lessons
Key vocabulary: vibration, transfer, volume, pitch, transmit, amplitude, novel
Resources: text sets on sound, whistle, tongue depressors, string, paper cups, paper clips, water, tuning forks, rubber bands, plastic wrap, cans, fishing line, computer/SMARTBoard, xylophone, http://phet.colorado.edu/en/simulation/sound

Significant task 2:

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a

learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

Independent reading may or may not be supplemented with "just right" content-aligned texts when appropriate or available throughout the unit. Skills that require emphasis and that cannot be done on independent level texts are emphasized through guided practice on a grade level appropriate texts through independent and small group conferences. Small group work and individual reading conferences are tailored to meet the differentiated needs of students based on the standards taught throughout the unit.

Prior to beginning this hands on activity, please review with students the rubric that will be used for assessment. Provide students an example of what they are expected to do. In small groups, students explore and select different design materials that they will use to make a simple instrument. In pairs, students write directions to construct their simple instrument and sketch what the instrument will look like, then build it, given specific perimeters (such as volume, pitch, quality of tone). Pairs of students test their instrument and modify the design to meet the criteria of the rubric. Students present and demonstrate their instrument to the whole group. Teachers focus instruction on speaking and listening during this portion of the task. Additional lessons on writing directions with clarity may be necessary. Give students examples of what their directions could look like. This is not a common type of writing in which students have

Building on this experience introduce students to the short movie "The Landfill Harmonic" This story is about an impoverished community in Paraguay that decided to make instruments from trash. Remind students that being literate also includes how we "read" various media. Students learn that media clips are oral texts from which we learn explicit information and make inferences. Model at various points in the clip important conclusions students can draw about this experience just from listening to these clips. As a whole class students summarize the movie and make inferences with partners. Students read at least two additional articles about "The Recycled Orchestra" from Paraguay independently to support the movie clip.

As readers students learn to compare information learned from various texts. Students should note what the articles say explicitly and make inferences based on the information read. Students work in small groups to compare information they have gathered in their science notebooks.

Timeline: 4-5 lessons
Key vocabulary: vibration, transfer, volume, pitch, transmit, amplitude
Resources: tongue depressors, string, paper cups, paper clips, water, tuning forks, rubber bands, plastic wrap, cans, fishing line, or any additional materials teacher or student brings from home

Significant task 3

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

Independent reading may or may not be supplemented with "just right" content-aligned texts when appropriate or available throughout the unit. Skills that require emphasis and that cannot be done on independent level texts are emphasized through guided practice on a grade level appropriate texts through independent and small group conferences. Small group work and individual reading conferences are tailored to meet the differentiated needs of students based on the standards taught throughout the unit.

In pairs, students will test the ability of various materials to absorb or reflect light. They will observe demonstrations for refraction (i.e. pencil in a glass of water) and conduct the experiment "The Mystery of the Reappearing Coin." In small groups, students will prove that light travels in a straight line and is always reflected at a specific angle using paper towel tubes, a mirror, and a flashlight. Throughout this process students will journal observations and summarize their conclusions using both pictures and words. As individuals, students read about white light and the spectrum and make notes and illustrations in their journals. This will be followed by a whole group discussion, highlighting the academic vocabulary from the reading.

Timeline: 4-5 lessons
Key vocabulary: reflect, absorb, refract, transparent, translucent, opaque, angle of incidence, photon
Resources: http://learningcenter.nsta.org/files/sc0912_37.pdf,
http://phet.colorado.edu/en/simulation/color-vision
http://learningcenter.nsta.org/files/sc0402_50.pdf

Common learning experiences:

- Sciencosaurus book
- Perk Up Your Ears, by Vicki Cobb
- Sound, Delta Science Reader
- BrainPop/Jr
- Color and Light, Delta Science Reader

Common assessments including the end of unit summative assessment:

• Student science journal entries • Given specific perimeters, students construct simple instruments • Presentation and demonstration of simple instruments
Teacher notes: A suggested text to supplement this unit is called The Composer is Dead by Lemony Snickett. Some versions are accompanied by the CD which includes the San Francisco Orchestra and narrated by Lemony Snickett.

Windsor Public Schools
Curriculum Map for the Elementary Level
Grade 5 Science

Unit 4: Sense Perception	Length of the unit: 4 Weeks
Purpose of the Unit: This unit teaches students about the importance of the senses in order for organisms to survive. Students discuss with peers and adults various "real-life" topics as they relate to the senses. Students use resources to further explore learning, develop new ideas, and to prove information gained in myriad ways. Through hands on experiences students create diagrams and models to demonstrate their understanding of how various senses function. Developing as speakers and listeners, students present information before the class in small groups and individually. Students read arguments about issues related to the senses and evaluate how authors have constructed arguments using key details as support or evidence.	
Common Core State Standards Addressed in the unit: **CT Science Standard 5.2** – Perceiving and responding to information about the environment is critical to the survival of organisms. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. RI.5.1 Determine two or more main ideas of a text and explain how they are supported by key details; summarize text. RI.5.2 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topics or subject area. RI.5.4 Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. RI.5.6 Explain how an author uses reasons and evidence to support particular point in a text, identifying which reasons and evidence support which points. RI.5.8 Read and comprehend informational texts at the high end of the 4-5 text complexity band independently and proficiently. RI.10	
Big Ideas: Structure and Function • The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.	Essential Questions: • How do the senses play a role in an organism's survival? • How do readers locate and write about

• Informational texts can be used strategically. • Ideas and information is shared in organized ways both orally and in writing.	specific information? • How is information shared?
Students will know: ▪ Animals have sense organs that are structured to gather information about their environment. Information perceived by the senses allows animals to find food, water, mates and protection. ▪ Each sense organ perceives specific kinds of stimuli. Some human senses are more or less developed than the senses of other animals. ▪ Sense organs transfer information through a network of nerves to the brain where it is interpreted and responded to. The brain responds by sending messages to all parts of the body. The type of response and the amount of time it takes for the response to occur vary depending on the stimulus. ▪ The human ear is structured to collect sound vibrations from the environment and pass them through the middle ear (eardrum and small bones) and inner ear (hair-lined tubes) to the auditory nerve where they are transformed into electrical signals that are sent to different parts of the brain. ▪ The human eye is structured to collect light through the cornea and the pupil. The amount of light that enters the eye is controlled by the iris. The cornea and the lens refract the light and focus it onto the retina and the optic nerve where it is transformed into electrical signals that are sent to different parts of the brain. ▪ For anything to be visible, light must be present. For a person to see an object, the	Students will be able to: ▪ Explain the role of sensory organs in perceiving stimuli (e.g., light/dark, heat/cold, flavors, pain, etc.) ▪ Pose testable questions and design experiments to determine factors that affect human reaction time. ▪ Conduct simple tests to explore the capabilities of the human senses. ▪ Summarize nonfiction text to explain the role of the brain and spinal cord in responding to information received from the sense organs. ▪ Identify the major structures of the human eye, ear, nose, skin and tongue, and explain their functions. ▪ Draw diagrams showing the straight path of light rays from a source to a reflecting object to the eye, allowing objects to be seen. ▪ Describe the properties of different materials and the structures in the human eye enable humans to perceive color. ▪ Quote accurately from a text. ▪ Reading for Information Standards: ▪ Draw inferences and summarize what a text says explicitly and implicitly. ▪ Determine two or more main ideas and explain how they are supported by key details.

light it reflects or produces must have a straight, unobstructed path to the eye. ▪ Human eyes have receptors for perceiving shades of red, orange, yellow, green, blue, indigo and violet. ▪ Sunlight (or "white light") is a combination of colors. White light passed through prisms, water droplets or diffraction gratings can be refracted to show its component colors: red, orange, yellow, green, blue, indigo and violet. ▪ The perceived color of an object depends on the color of the light illuminating it and the way the light interacts with the object. The color humans see is the color that is reflected by the object. For example, an object that appears green is absorbing all colors except green, which is reflected to the eye. ▪ Human skin is structured to detect information related to texture, temperature, pressure and vibration. Each sensation has different receptors distributed around the body; some areas of the body have greater concentrations of receptors for certain sensations, making those areas more sensitive than others to texture, temperature, or pressure. ▪ Human noses are structured to collect and detect chemicals floating in the air (odors). Tiny hairs behind the nose have special receptors that respond to airborne chemicals and produce electrical signals that are transmitted to different parts of the brain by the olfactory nerve. ▪ Human tongues are sense organs that are structured for detecting chemicals dissolved in saliva (flavors). Taste buds respond to 4 basic tastes: salty, sweet,	

sour and bitter. Special receptors in taste buds respond to tastes and produce electrical signals that transmit information through nerves to different parts of the brain.	

Significant task 1: - The Senses

Essential Questions
How do the senses play a role in an organism's survival?
How do readers locate and write about specific information?

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

Independent reading may or may not be supplemented with "just right" content-aligned texts when appropriate or available throughout the unit. Skills that require emphasis and that cannot be done on independent level texts are emphasized through guided practice on a grade level appropriate texts through independent and small group conferences. Small group work and individual reading conferences are tailored to meet the differentiated needs of students based on the standards taught throughout the unit.

In significant task 1 students participate in whole class discussions around factual and probing questions involving the senses. Students share/explore their thinking and background knowledge about how perceiving and responding to information about the environment is critical to the survival of organisms (refer to what students will know and be able to do for specific content objectives 1-3 and develop understanding of student background knowledge). Place or distribute the first three science content objectives (see above) on the "board" or on a separate piece chart paper. Students are informed that these are facts. Part of the student charge is to explore these facts in numerous ways including through hands-on activities, informational texts and diverse media. The teacher leads the discussion with an engaging practical discussion topic such as, "do lobsters scream in pain?" Ask students to think about what they know about the 5 senses, the facts on the board and discuss with a partner or triad. Inform students that readers use informational texts and resources to solve problems and ask questions. Utilizing either a text resource or a reputable website to quickly disprove that lobsters do not have vocal chords so they cannot scream. Continue the classroom discussion by asking students how does their thinking/discussion change when the question posed is, "do lobsters feel pain?" Provide students with text and internet resources and time to provide

information on both sides of the argument. This is an argument about whether or not crustaceans have the sense of touch (not just reflex) and specifically pain. Model through mini lesson instruction how readers examine various arguments to develop an understanding of questions and to solve problems.

Aligning with the first 3 science content objectives assign students to three groups. Using the Discovery Ed resources and additional teacher provided resources, students work to find key details to support the first three facts. The teacher models through direct instruction how readers use informational texts to answer problems by looking for specific information. Students collect various key details and examples to support their assigned group. Information is shared on chart paper. Each group is responsible for collecting information from the other two groups in their notebooks. Through mini lesson instruction the teacher demonstrates how this information can be written into a paragraph with a topic sentence and key reasons/supporting details.

Through teacher modeling, demonstrate using nonfiction or informational resources for explicit information to solve problems efficiently, confirm or develop new knowledge, or clarify misunderstandings. One scenario teachers can use is the idea if people should talk to plants. Teachers can develop scenarios where someone they know spends a lot of time talking to their plants because they believe it helps them grow. Pose the question to students if they believe this is a good use of the person's time. Allow students to discuss why they believe this is important or not and give support for their conclusions based on whatever background knowledge they currently possess Follow up class discussion with the media clip Plants Can Hear You!* In small groups students discuss the effects and consequences of their new learning, draw various conclusions and extend to new contexts. Student groups orally share out conclusions with the whole class.

*http://m.youtube.com/watch?feature=related&v=ApZ59MSty4o.

Through whole class instruction the teacher uses direct, explicit instruction to demonstrate how readers use texts to acquire specific information (refer to what students will know and be able to do for content-based objectives). Model selecting the best resources, using text features to locate specific information and recording and summarizing facts. With partners students begin to develop theories about the importance of the eye and ear to human survival. Students use a variety of texts and sources from which they locate factual information and summarize their learning. In reading journals students write responses to prompts that allow them to explore the major objectives in writing using evidence from class discussions, readings and additional learning experiences as support.

Individuals identify the major structures of the human eye and ear by creating and studying paper models. Each student creates a "foldable" to explain the role of sensory organs in perceiving stimuli to another classmate. Pairs use a rubric to assess and provide feedback to one another.

Timeline: 5-7 lessons
Key vocabulary: sense organ, receptor, stimulus, response, nervous system, vibration, reflect, refract, cornea, pupil, iris, lens, retina, white light, absorb
Resources: texts at various reading levels about the eye and ear

Significant task 2:

Essential Questions
How do the senses play a role in an organism's survival?
How do readers locate and write about specific information?
How is information shared?

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

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In pairs students complete the embedded performance task "Catch It" in which they will formulate a testable question based on observations. Students will design a scientifically "fair test" to determine the factors that affect human reaction time and record the design procedure in their science notebooks. Pairs will collect and measure data, recording it in an organized way in their science notebooks. All data and observations will be displayed on a poster. Partners present their ideas through oral and written language describing observations, hypotheses, procedures and conclusions. Through whole class instruction the teacher provides lessons in writing effective questions and design procedures. Additionally, students read an article about what make s a test "fair" and discuss what the article says explicitly making inferences and relating to the task. Use of an oral presentation rubric is used to assess presentations.

Timeline: 4-5 lessons
Key vocabulary: sense organ, receptor, stimulus, response, nervous system, vibration, reflect, refract, cornea, pupil, iris, lens, retina, white light, absorb
Resources:

Significant task 3:

Essential Question

How do the senses play a role in an organism's survival?
How do readers locate and write about specific information?
How is information shared?

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

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Students will view two BrainPop video clips (Color and The Electromagnetic Spectrum) as an introduction as to how humans see color. The teacher assigns students various elements of important to listen for and to take notes/and or remember for later discussion. After viewing the video each group educates another group in their area of expertise.

In groups, they will use prisms and diffraction gratings to bend natural and artificially produced white light. They will record the colors that they see in their science notebooks in the order that they appear (red, orange, yellow, green, blue, indigo, violet). Pairs will use paper towel tubes, cardboard squares, and flashlights to prove that lights travels in a straight path and must be unobstructed in order for anything to be visible. Partners will draw diagrams in their science notebooks showing the straight path of the light rays from the source to an object.

Timeline: 4-5 lessons
Key vocabulary: sense organ, receptor, stimulus, response, nervous system, vibration, reflect, refract, cornea, pupil, iris, lens, retina, white light, absorb
Resources:

Common learning experiences:

- Science inquiry lessons
- Partner reading
- Direct instruction in domain-specific vocabulary

Common assessments including the end of unit summative assessment:

- End of unit summative science assessment

Teacher notes:

Windsor Public Schools
Curriculum Map for the Elementary Level
Grade 5 ELA/Science

<table>
<tr><td>Unit 5A: Earth, Moon, Sun</td><td>Length of the unit: 3 Weeks/30 days</td></tr>
<tr><td colspan="2">Purpose of the Unit:
This unit explores the idea that most objects in the solar system are in regular and predictable motion using the Earth, sun, and moon as the primary examples. Students practice confirming information with a variety sources including hands on learning experiences in and out of the classroom. Students compare information from a variety of sources and draw conclusions and summarize learning. Students practice in multiple tasks presenting ideas to groups within the class each time using peer and adult feedback to improve oral presentations.</td></tr>
<tr><td colspan="2">Common Core State Standards Addressed in the unit: (Provide the link to the specific standards.)

CT Science Standard 5.3 – Most objects in the solar system are in a regular and predictable motion.

Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. (RI.5.3)

Compare and contrast the overall structure of events, ideas, concepts, or information in two or more texts. (RI.5.5)

Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. (RI.5.6)

Conduct shot research projects that use several sources to build knowledge through investigation of different aspects of a topic. (W.5.7)

Summarize a written text read aloud or information presented in diverse media and formats including visually, quantitatively, and orally. (SL.5.2)</td></tr>
<tr><td>Big Ideas: Earth in the Solar System
The positions of the earth and moon relative to the sun explain the cycles of day and night, and the monthly moon phases.
Readers write and discuss ideas in texts</td><td>Essential Questions:
How does the position of the Earth relative to the sun explain day and night?
Why does the appearance of the moon change throughout the month?
What do readers do with information they learn and read?</td></tr>
</table>

Students will know: ▪ The sun, Earth and its moon are spherical objects that move in two ways: they spin (rotate) and they change positions relative to each other (revolve). ▪ The sun is a star that produces light that travels in straight lines away from the sun in all directions. Light from the sun illuminates objects that reflect light, including Earth and its moon. The side of the earth that is facing the sun experiences daylight; the side of the earth facing away from the sun experiences night. All parts of the earth experience a cycle that includes both day and night, providing evidence that the earth is rotating on its axis. ▪ The amount of time it takes for the earth to rotate once on its axis is regular and predictable (24 hours), and is called "a day." Earth's rotation makes it appear as if the sun is moving across the sky from east to west. ▪ The moon is a rocky object that revolves around the earth in a circular path called an orbit. The amount of time it takes for the moon to revolve once around the earth is about 29 days and is called a "lunar month." ▪ Half of the moon is always illuminated by the sun. Phases of the moon occur because a different portion of the lit half of the moon is visible from Earth each day as the moon revolves around the earth. ▪ The changes in the moon's phases occur	Students will be able to: ▪ Explain the motion of the earth relative to the sun that causes Earth to experience cycles of day and night. ▪ Construct models demonstrating Earth's rotation on its axis, the moon's revolution around the earth, and the earth and moon revolving around the sun. ▪ Distinguish between the sun as a source of light and the moon as a reflection of that light. ▪ Observe and record the moon's appearance over time and analyze findings to describe the cyclical changes in its appearance from Earth (moon phases). ▪ Relate the moon phases to changes in the moon's position relative to the earth and sun during its 29-day revolution around the earth.

in a regular and predictable sequence. At predictable periods during the lunar cycle, the moon is visible in either the daytime or the nighttime sky. ▪ At the beginning of a lunar month, no lit part of the moon is visible from Earth (new moon). As the moon progresses through the first two quarters of its complete trip around the earth, larger portions of the right side of the moon are illuminated each day. When the moon has completed half its trip around the earth, the full moon is illuminated. During the third and fourth quarters of the moon's trip around the earth, the illuminated portion gradually decreases so only the left side is illuminated and finally no lit portion of the moon is visible from Earth again. ▪ Like the sun, the moon appears to rise at the eastern horizon and set at the western horizon due to the earth's rotation. From one day to the next, when observed at the same time from the same location, the moon's position in the sky varies in predictable ways.	

Significant task 1:

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Independent reading may or may not be supplemented with "just right" content-aligned texts when appropriate or available throughout the unit. Skills that require emphasis and that cannot be done on independent level texts are emphasized through guided practice on a grade level appropriate texts through independent and small group conferences. Small group work and individual reading conferences are tailored to meet the differentiated needs of students based on the standards taught throughout the unit

Using a lamp, the teacher will demonstrate how the light of the moon is a reflection of the sun's light. In small groups students will create models to demonstrate the Earth's rotation on its axis using a Styrofoam ball and a stick. They will draw conclusions relative to the sun and how the Earth's rotation impacts the 24 hour cycle of day and night. Individuals will create pictures and diagrams of the Earth's rotation in their notebooks and summarize their findings. If necessary, model writing conclusions for students to accurately communicate their thoughts.

As individuals and in pairs, students read various texts about the moon and sun. Daily students record factual information in their science notebooks and share new learning with the whole class. The teacher provides direct instruction in how readers examine informational topics for similarities and differences in point of view among sources. In small groups students select a topic of interest as it relates to the sun and moon. The topic should present two sides but not necessarily be controversial. For example, should we explore colonies in the moon? Teachers may need to provide instruction in recording information from and evaluating the credibility of sources. Students confirm and summarize new learning with a variety of learning experiences both orally in their small groups and in science notebooks. Small groups eventually organize and prepare to lead a class discussion on their selected topic of choice presenting the information they've gained from their learning with their peers. Teachers provide students with a clear map of the steps necessary along with exemplars of performance, prior to the end of the task.

Timeline: 5-7 days
Key vocabulary: sphere, illuminate, reflect, rotate, day/night (24-hour rotation period), horizon, orbit, revolve, month (one lunar cycle), moon phase, new moon, summarize, credibility, synthesize, relationship, concept, idea
Resources: 5th grade science binder

Significant task 2:

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

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Small groups will continue to use models from task #1 to show the moon's revolution around

the Earth and the relationship of the motions between the Earth, moon, and sun. The teacher provides direct instruction in how readers confirm factual information and learning experiences and summarize both orally and in science notebooks. Students will use various non-fiction texts to assist in their understanding of the relationship between these three elements of the Solar System. Students will draw diagrams in their notebooks, label and record their findings. Groups will organize and present each of their discoveries for the class. Students use oral presentation rubric to assess presentations.

Timeline: 5-7 days
Key vocabulary: sphere, illuminate, reflect, rotate, day/night (24-hour rotation period), horizon, orbit, revolve, month (one lunar cycle), moon phase, new moon
Resources: 5th grade science binder

Significant task 3:

During integrated science units, the order of workshop might be slightly altered due to the nature of science inquiry. In this regard, students may begin the unit or daily lesson with a learning experience that the teacher then follows up with explicit instruction about how literate scientists use these experiences, supplement and integrate with information from a variety of sources, and share both orally and in writing how this information is applied in the 21st century. These lessons provide content to the skills being developed as readers and writers of information, facts, and ideas.

Independent reading may or may not be supplemented with "just right" content-aligned texts when appropriate or available throughout the unit. Skills that require emphasis and that cannot be done on independent level texts are emphasized through guided practice on a grade level appropriate texts through independent and small group conferences. Small group work and individual reading conferences are tailored to meet the differentiated needs of students based on the standards taught throughout the unit.

Individuals will keep "Moon Logs" and record the moon's appearance over the course of a month. They will be asked to describe the cyclical changes in its appearance and note the patterns and changes in how it appears from Earth. As a whole group, students and teachers will discuss their findings on a regular basis. Through discussions students will be able to relate the moon phases to changes in the moon's position relative to the Earth and sun. Individuals will use various non-fiction resources to confirm daily appearance and to answer any questions that may arise.

Timeline: 30 days*
Key vocabulary: sphere, illuminate, reflect, rotate, day/night (24-hour rotation period), horizon, orbit, revolve, month (one lunar cycle), moon phase, new moon
Resources:

Common learning experiences:

- Sciensaurus text
- Moon journal
- Brainpop
- Various non-fiction texts which may include:
    - The Moon By: Seymour Simon
    - The Moon Appears to Change By: Franklin M. Branly
    - The Phases of the Moon By: Gillia M. Olson
    - The Moon Book By: Gail Gibbons
    - Phases of the Moon By: Bob Crelin
    - The Reason for Seasons By: Gail Gibbons
    - So That's How the Moon Changes Shape By: Allan Fowler

Common assessments including the end of unit summative assessment:
(Provide link to assessments and rubrics.)

- Science Notebooks
- Moon Log
- Group presentations

Consider the 21st Century Learning Framework when designing common assessments.

Teacher notes:

Windsor Public Schools
Curriculum Map for the Elementary Level
Grade 5 ELA/Science

Unit 5B: Optical Tools and Technology	Length of the unit: 4 Weeks

Purpose of the Unit:
The purpose of this unit is to explore how optical tools and technology have made advances to improve our lives. Students explore various tools and draw conclusions about their function and purpose. As readers and writers students work to confirm and verify information that they learn as scientist. Students summarize both orally and written explicit information and draw conclusions while applying new academic vocabulary.

Common Core State Standards Addressed in the unit: (Provide the link to the specific standards.)
CT Science Standard 5.4 – Humans have the capacity to build and use tools to advance the quality of their lives.

Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. R.I.5.1

Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. R.I.5.2

Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. R.I.5.3

Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topics or subject area. R.I.5.4

Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. 5.I.5.6

Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. R.I.5.9

By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. R.I.5.10

Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a

list of sources. W.5.8 Draw evidence from informational texts to support analysis, reflection, and research. W.5.9 Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. SL.5.1 Summarize a written text read aloud or information presented in diverse media formats, including visually, quantitatively, and orally. SL.5.2

Big Ideas: Science and Technology in Society	Essential Questions:
• Advances in technology allow individuals to acquire new information about the world. • Readers read to learn and verify information.	• How do optical tools allow us to view things differently and acquire new information? • How is the structure of the eye like a camera? • How do readers use texts to learn new information? • How do we verify what we see and learn from others with sources?
Students will know: ▪ People design optical tools (for example, binoculars, telescopes, eyeglasses or periscopes) that enable them to see things better or to see what cannot be seen by human eyes alone. Optical tools change the path of light by reflecting or refracting it. ▪ Throughout history new optical technologies have led to new discoveries and understandings that change people's lives. ▪ Periscopes allow people to see things that are not within their line of sight (for example, around corners, over walls, under a table, or above the ocean's surface from a submerged submarine). ▪ Telescopes make distant objects appear larger (and therefore closer). ▪ Magnifiers, such as hand lenses,	Students will be able to: ▪ Generalize that optical tools, such as binoculars, telescopes, eyeglasses or periscopes, change the path of light by reflecting or refracting it. ▪ Construct simple periscopes and telescopes, and analyze how the placement of their lenses and mirrors affects the quality of the image formed. ▪ Evaluate the best optical instrument to perform a given task. ▪ Design and conduct simple investigations to determine how the shape of a lens or mirror (concave, convex, flat) affects the direction in which light rays travel. ▪ Explain how eyeglasses or

microscopes or make-up mirrors, make objects appear larger.

- The shape of a lens or mirror (concave, convex or flat) affects the direction in which light travels:
    - Telescopes focus light using a lens that refracts the light (refracting telescope) or a curved mirror that reflects the light (reflecting telescope).
    - Periscopes use flat mirrors to reflect light to change its path.
    - Magnifying glasses use convex lenses to refract light so that objects appear larger.
- Some human eyes do not focus light properly onto the retina. Eyeglasses are lenses that improve vision by changing the path of light (refracting it) so it forms an image on the retina.
- Cameras have parts that function similarly to the human eye:

HUMAN	CAMERA	FUNCTION
Eyelid	Lens cap	Protect
Pupil	Lens opening	Allow light
Cornea,	Lens	Focus
Retina	Film (or digital	Respond to light

contact lenses improve vision by changing the path of light to the retina.

- Analyze the similarities and differences between structures of the human eye and those of a simple camera.
- Summarize information and make inferences about information in scientific/historical texts.
- Support information with evidence from a variety of learning experiences.
- Use academic language accurately.
- Analyze and compare information from multiple sources.
- Integrate knowledge from multiple sources.
- Take new learning and apply it to modern and potential future issues.

Significant task 1:

Northwest Park Demonstration - students should create a TK-W-L chart in their science notebooks prior to the demonstration. The TK column should be what they think they know about optics and optical tools and the W is what they want to learn. The TK and W portions are

completed prior to the demonstration and the L is completed after the learning activity.

In small groups, students travel through centers that demonstrate various concepts related to light. They will explore various lenses in tools used to magnify objects such as telescopes, monoculars, and binoculars. Students will observe the visible spectrum using diffraction gratings and a spectroscope and record the colors that they see. Individuals will assemble a simple telescope. Pairs will analyze the size and shape of a lens and draw conclusions about the impact of this on the direction of light rays. After completing the centers, students work in small groups to share what they learned, confirm or change what they thought they knew.

Students build on the inquiry centers with verifying and extending what they learned with various texts. Students learn that as readers experience and learn new things they extend and verify what they've learned with various resources. Students find a partner with similar interests based on their previously made TK-W-L charts and work in pairs to further explore learning. Share with students the website Exploring the Science of Light at http://www.optics4kids.org/home/tutorials.aspx#vision. Remind students about the credibility of resources. Highlight the awards and sponsor of the site The Optical Society Association. The teacher should review the organization's credibility reminding students that all information is not equal and good readers evaluate their sources. Teachers remind students prior to reading that reading for information requires the use of multiple strategies previously learned such as activating schema, determining importance and synthesizing information.

Student pairs read the section "what is optics" and then select from two or three of the subcategories related to optics that align with what they learned from the learning centers. Students should work to confirm two pieces of new learning and investigate a topic that they wanted to know more about but did not yet learn through the demonstration centers. In their science notebooks students write a paragraph that explains two new things they have learned about optics and provide evidence from both the demonstrations and text resources to support conclusions.

Timeline: 5-8 lessons
Key vocabulary: optical tool, hand lens, magnifying glass, telescope, periscope, lens, mirror, concave, convex, reflect, refract, focus, camera and eye parts (see chart under “Students will know” #8)
Resources: Science binder, center materials

Significant task 2:
Teachers provide students with multiple resources about the human eye including media clips and Internet resources. For 3-5 days during independent reading students read about the human eye and record factual information that they discover in their science notebooks. Remind students that they are reading for factual information and not opinions. Daily students should be paired with various students to share what they have learned. Each day students

should add to what they've learned from their partners. During explicit mini lesson instruction demonstrate how readers use topic sentences, headings, and skimming to locate important information. At least one lesson should be how readers examine diagrams. Collectively evaluate a diagram of the human eye and using a blank copy of the diagram, fill in the information.

Building on the work in centers, student discuss as a whole class and in small groups how what they are learning about optics and optical tools apply to their new learning about the human eye. Teachers remind students that scientist use all of their learning to hypothesize about how we can improve how we live. Students and teacher discuss recent innovations in technology with regards to the eye including LASIK surgery, curing blindness, and advances in contact lenses. Students share ideas about what life will be like in 20 years with regards to how we deal with issues related to the human eye.

In small groups students will construct a pinhole camera. Individuals will analyze the similarities and differences between the structures of the human eye and those of a simple camera. Students will record these comparisons on a two-column data table. Throughout this process students will journal any observations and summarize their conclusions. All learning will be followed by a whole group discussion highlighting academic vocabulary and summarizing the objective.

Timeline: 4-5 lessons
Key vocabulary: optical tool, hand lens, magnifying glass, telescope, periscope, lens, mirror, concave, convex, reflect, refract, focus, camera and eye parts (see chart under "Students will know" #8)
Resources: resources on the human eye, materials for pinhole camera, and science binder and notebooks

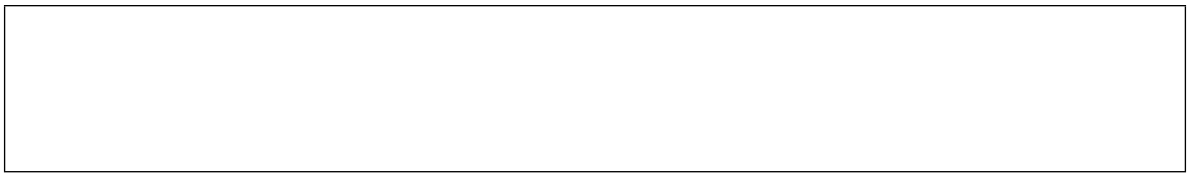
Common learning experiences:

- Northwest park demonstration centers
- Constructing the pinhole camera
- Partner reading
- Direct domain-specific vocabulary

Common assessments including the end of unit summative assessment:

- Optics assessment
- How does technology help is live better? (Written response)

Teacher notes:



Curriculum Map for the Intermediate Level
Grade 5 Reading

Unit 7 Fantasy Book Clubs	Length of the Unit: 5 weeks

Purpose of the Unit: The purpose of this unit is to harness (or launch) children's passion for fantasy reading, as a means of increasing their facility with complex texts and maintaining their collaborative interpretation skills (book clubs) in alignment with the Common Core State Standards. Fantasy novels are inherently complex so students will need to pay close attention to their reading, assuming that all details matter. Readers will be accumulating and synthesizing a great deal of information as they read across novels noticing patterns, archetypes and themes. Our teaching will give them the academic language for the literary traditions of fantasy novels and support them as they articulate their interpretations in literary conversations.

Common Core State Standards Addressed in the unit:

RL.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RL.5.2 Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.

RL.5.3 Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).

RL.5.4 Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes.

RL.5.5 Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem.

RL.5.6 Describe how a narrator's or speaker's point of view influences how events are described.

RL.5.9 Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics.

RL.5.10 By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently.

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

L.5.3a Expand, combine, and reduce sentences for meaning, reader/listener interest, and style.

L.5.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

L.5.4a Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.

L.5.4b Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *photograph, photosynthesis*).

L5.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

L5.5a Interpret figurative language, including similes and metaphors, in context.

Big Ideas:	Essential Questions:
▪ fantasy stories are complicated and readers need to use multiple resources and strategies to understand another world ▪ fantasy stories are about the struggle between good and evil, not just Dwarfs and Elves ▪ understanding archetypes and narratives structures is necessary for our literary knowledge and familiarity with the fantasy genre as well as deepening analysis and extending literary conversations	▪ what do we need to know in order to make sense of people, places and plotlines in fantasy stories? ▪ what do we need to understand about themes in fantasy stories? ▪ Why is knowledge about archetypes and narrative structures important?
Students will know:	Students will be able to:
▪ how to use strategies in order to set themselves up to read fantasy ▪ how fantasy is different from other genres ▪ archetypes and quest narrative structure are integral to fantasy ▪ having literary conversations deepens our analysis and understanding of fantasy and other genres	▪ synthesize details about characters and setting from a cover, blurb and beginning of a story. ▪ develop thematic understanding by looking for inner conflict in characters ▪ participate in book club conversations ▪ identify archetypes and quest patterns

Significant task 1: Learning to Build the World of the Story When It's Another World: People, Places, and Plots

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

In significant task one, teachers model how to build the world of a fantasy story through people, places and plots. As teachers model this work in their own, or class readers notebook, students simultaneously do the same work in their own readers notebook on their own fantasy book. Teachers will model how to:

a. synthesize details from the cover, blurb and beginning of the story in a read aloud such as The Paper Bag Princess. Students do this work using books gathered for the unit. Students adept at constructing the setting can be taken to the next level and taught how to analyze, not just describe, a setting for psychological implications as in The Paper Bag Princess. Ex: Elizabeth lives in a world where sudden violence can destroy all you have, what are the psychological implications of living in such a world?
b. determine the meanings of challenging fantasy language that may be archaic, invented or complicated. Strategies will include: 1. Using context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase 2. Using common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *photograph, photosynthesis*) 3. Demonstrating the understanding of figurative language, word relationships, and nuances in word meanings 4.Interpreting figurative language, including similes and metaphors, in context.
c. learn alongside the main character to figure out what the rules are about the place where the adventure, or quest takes place. Authors educate readers as the character learns about the values, beliefs, and customs of the world they are experiencing. Stronger readers will come to know that readers synthesize information ahead of the character.
d. pay attention to inner and outer struggles of the characters and track them as they read.
e. use charts, timelines and other graphic organizers in readers notebooks to track multiple plotlines because fantasy characters typically solve one problem and then another arises. Plotlines will multiply across a series.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.3, RL.5.4, RL.5.5, SL.5.1, L.5.4, L.5.4a, L.5.4b, L.5.5, L.5.5a

Timeline: 10 days

Key vocabulary: world of fantasy, human condition, struggle between good and evil, conflict, corrupt, magical elements, synthesize, analyze, archaic, metaphor, simile, plotlines, *additional terms related to study of fantasy.*

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit Seven or Eight – Fantasy Reading Book Clubs
- Texts sets of fantasy novels
- The Paper Bag Princess by Robert Munsch
- Deltora Quest Series by Emily Rodda – Books 1 and 2

Significant task 2: Developing Thematic Understanding – It's About More Than Dwarfs and Elves

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5

minute share.

In significant task two, teachers will work alongside students using a read aloud text as students do this work in a book club book. Teachers will:

a. explain how the term "Here be Dragons" on old maps was a way for mariners to symbolize a host of unknown dangers that travelers might encounter. Students will learn that in fantasy, these "dragons" may be actual or metaphoric. Students will understand that "dragons" will refer to the inner struggle characters face. They will be encouraged to consider the "dragons" in their own lives as well as the lives of their characters. Ex: (The Paper Bag Princess) Elizabeth faces an actual dragon, but Ronald's brutality is a conflict too and another type of dragon.
b. instruct students in asking the question, "What is this story *really* about?" and discuss underlying themes and life lessons: struggle between good and evil, how power corrupts, how the physically strong can protect others, how the smallest and weakest can find moral strength to defeat evil, how love drives us to be better than we are.
c. Instruct students to look for character flaws in the hero and admirable traits in the villain, Ex: characters can be unpredictable or deceptive because they struggle between good and evil, a character can be trouble yet charming, heroic yet have a nasty personality

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.2, RL.5.3, RL.5.6, RL.5.9, RL.5.10, SL.5.1, L.5.3a

Timeline: 5 days

Key vocabulary: metaphoric dragons, inner conflict, themes, power corrupts, struggle between good and evil, moral strength, unpredictable, deceptive, *additional terms related to study of fantasy*

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit Seven or Eight – Fantasy Reading Book Clubs
- Texts sets of fantasy novels
- The Paper Bag Princess by Robert Munsch
- Deltora Quest Series by Emily Rodda – Books 1 and 2

Significant task 3: Literary Traditions, Including Archetypes, Quest Structures, and Thematic Patterns

Each day's lesson should follow the Reader's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, guided practice, and vocabulary instruction that takes about 15 minutes. This is followed by 45 minutes of independent reading (including writing either in the form of post-its or a written response to reading) and conferences/ small group instruction with a mid-workshop teaching point if needed, and is concluded with a 5 minute share.

In significant task three, teachers will:

a. move students to a deeper level of comprehension by learning that characters often

play expected roles. Archetypes are characters that are standard in stories. Students will learn that the main character is usually the hero. Hero-types include: the traditional hero, the reluctant hero and the anti-hero. The hero is commonly uncertain of his or her powers. Other common character roles in fantasy include: the mentor, who teaches and guides the young hero and commonly dies before the hero comes of age; the companions, one of which is commonly jealous and volatile; and the villain who commonly has many guises.

b. explain the quest structure to students through read aloud text and expect to see this work in book club conversations. A quest narrative structure means that the hero is given a quest, meaning that he or she must journey to achieve something. This journey might involve rescuing a captive or a sacred object or destroying a villain or dangerous object. A third common narrative quest is where the hero has entered another world or place and must find a way out as in *Alice in Wonderland*.
c. show students how to think across texts and re-examine themes in their books. By the end of fantasy stories, good triumphs over evil. The main character has to overcome internal struggles and embrace his or her essential goodness in order for good to triumph for all. Self-sacrifice is one of the most important themes as the hero must put him or herself in danger's way.
d. have readers reflect in their notebooks about this particular unit but also about the year and how far they have come in accomplishing their reading goals.

This task directly targets the following Common Core State Standards: RL.5.1, RL.5.2, RL.5.3, SL.5.1, RL.5.10, L.5.3a

Timeline: 6 days

Key vocabulary: mentor, come of age, archetypes, quest narrative structure, themes, journey, captive, sacred object, villain, traditional hero, reluctant hero, anti-hero, disguised, benevolent, jealous, volatile, guises, moral triumph, *additional terms related to study of fantasy*

Resources:

- Teachers College Reading and Writing Project Reading Curricular Calendar, Fifth Grade Unit Seven or Eight – Fantasy Reading Book Clubs
- Texts sets of fantasy novels
- The Paper Bag Princess by Robert Munsch
- Deltora Quest Series by Emily Rodda – Books 1 and 2

Common learning experiences:

- Interactive Read Aloud: Read picture books such as The Paper Bag Princess and short chapter books so that you can read more than one in the series across the unit. Teachers should choose fantasy books that clearly exemplify the character archetypes and quest narrative structure.

Common assessments including the end of unit summative assessment:

- At minimum, a Teachers College Reading and Writing Project running record (TCRR) on each student's independent reading level should be completed in September and at least one additional time each term. Additional TCRRs can be done at any time.
- Anecdotal notes on reading behaviors, talk and writing

- Reading conferences following the research, compliment, teach sequence
- Analysis of post-it notes, reader's notebooks and partner conversations
- Analysis of reading logs

Teacher notes:

- The unit is closely derived from "Learning from the Elves," in the volume, Constructing Curriculum of the series, Units of Study for Teaching Reading Grades 3-5, as well as A Quick Guide to Reading Through Fantasy Novels both by Mary Ehrenworth.
- We want our students to know: In fantasy, everything is more important, more intense, more vivid.
- When we study fantasy, we are really studying the human condition.
- The stories are really about the struggle between good and evil, rather than elves and hobbits. They are about how power sometimes corrupts, the quest to be better than we are and how even the smallest of us can affect what happens in this world
- Information about archetypes, quest structures and thematic patterns will be helpful
- Fantasy is complicated and readers must use multiple resources to research settings, i.e. the cover, blurbs and details from the beginning for clues about time period and magical elements
- Teachers should consider using The Paper Bag Princess and Deltora Quest – Books 1 and 2 as read alouds for this unit.

Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5 Writing

Unit 1: Narrative Craft	Length of the Unit: 4 weeks

Purpose of the Unit:
The purpose of this unit is to align the level of student writing to meet the level expected in the Common Core State Standards. Students are reminded to use all that they have learned about narrative writing to generate, develop and tell stories. Students learn to move through the writing process to elaborate and develop as sophisticated story tellers. Additionally, as students grow as readers, they learn to use sophisticated mentor texts as exemplars of how "good" writers write. Students write at least 3-4 complete narratives as a result of this unit.

Common Core State Standards Addressed in the unit:

- Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. (W5.3)
  - Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.
  - Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations.
  - Use a variety of transitional words, phrases, and clauses to manage the sequence of events.
  - Use concrete words and phrases and sensory details to convey experiences and events precisely.
  - Provide a conclusion that follows from the narrated experiences or events.
- Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (W.5.5)
- With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (W.5.6)
- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. (W5.10)

Big Ideas:	Essential Questions:
▪ Writers draw on all they know to grow as a writer. ▪ Writers take their time telling a story using specificity and stretching out important parts.	▪ How do writers improve the quality of their writing? ▪ How do writers elaborate on their writing?

Students will know: ▪ stories are told in various sequences and authors select the sequence to suit the story's purpose ▪ writers use various techniques to tell stories	Students will be able to: ▪ write narratives with event sequences ▪ use effective techniques ▪ use descriptive details ▪ establish a situation ▪ introduce a narrator and/or character ▪ organize events that unfold naturally ▪ use a variety of transitional techniques ▪ use sensory details to convey experiences and events precisely ▪ use concrete words and phrases to convey experiences and events precisely ▪ provide a conclusion to narrated events

Significant task 1: Generating Ideas and Learning Strategies – Narrative Writing

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

**Begin this unit with the on demand writing assignment in the narrative genre. Use the 6+1 trait rubric to assess.*

In significant task one, teachers launch workshop by creating a writer's notebook with the students. Teachers should share an actual journal (some of which can be downloaded from the internet) sharing the multiple types of entries a journal contains like special people or events that have happened in special places. Teachers may have students decorate their journals to spark ideas. Some teachers ask that students carry their journal with them at all times so to be ready to record an idea in a flash. One variation on this strategy is for students to carry a tiny notebook and copy only the best ideas in their journal. Additionally, begin collecting examples of 5th grade writing so students have models of the writing they will do.

Teachers use direct instruction to remind students that writers carry with them a repertoire of strategies. Generate with students a list of strategies they have already learned. Focus student feedback on strategies. Use this time to demonstrate how students can begin to take these strategies and add purpose and depth to their learning. For example, one strategy that might make the list is jotting down a bunch of ideas and narrowing it down to one. 5th graders might only record one or two of their very best ideas. Students become decision makers as a part of this learning executing choice about how they will now think about their strategies for narrative writing. Throughout this task students learn that daily in writing workshop they should assess their work, review their options, and make decisions about what work needs to be done. Students do this while also practicing the daily mini lesson's objective including lessons that emphasize meaning and significance in writing and decision-making of authors. Students receive instruction in personal significance and making stories their own.

Students continue to receive instruction in "show don't tell," putting themselves in the character's shoes, and writing from various points of view as an instructional strategy to lift the

quality of their work. Students produce at least one published narrative by the end of the task.

This task directly targets the following Common Core State Standards: **W.5.3., W.3.5.a., W.5.3.b., W.5.3.d, W.5.5.**

Timeline: 5-6 days
Key vocabulary:. Repertoire, strategies, generate, feedback, meaning, significance, point of view
Resources:

- Teachers College Narrative Craft 5th grade
- Teachers College Assessments CD

Significant task 2: The Writing Process

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

In significant task two, teachers provide direct instruction in taking a seed idea through the writing process. This is also a good time for teachers to review with 5th grade students the 6+1 trait rubric. Through direct instruction emphasize how craft and revision are driven by the author's desire to create meaning. Students learn to use reflective questions like, "What is my story really about? What do I want to say about this event?" Teachers extend this learning to lessons that example how one episode can be written from different point of views. By the end of this task students will have written two narratives selecting one to take to a published piece.

This task directly targets the following Common Core State Standards: **W.5.3., W.3.6., W.5.10.**

Timeline: 7-10 days
Key vocabulary: 6+1 trait rubric, writing process vocabulary (generating, drafting, revising, editing, publishing)
Resources:

- TC Narrative Writing 5th grade
- TC Assessment CD

Significant task 3

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

Significant task 3 begins with the goal of publishing a third personal narrative. Students receive instruction in how Close reading of texts can be used as a learning strategy for writers. Students learn to use questions like, "What did Sandra Cisneros do to write her story that I, too, can try?" Students receive direct instruction in annotating and analyzing texts to grow as published authors. Students continue to return to pieces previously written as sources of stories to practice various strategies.

This task directly targets the following Common Core State Standards: W.5.3., W.5.5., W.5.6., W.5.10

Timeline: 10 days
Key vocabulary: close reading, analyzing annotating,
Resources:

- Teachers College Narrative Craft 5th grade
- Teachers College Assessments CD
- Sandra Cisneros "Papa and Eleven

Common learning experiences:

- Peer feedback and revision partnerships
- Teacher conferences in individual, differentiated writing goals
- Grammar and punctuation instruction as dictated by class need
- Small group instruction in shared learning objectives
- Use of mentor texts as exemplars of quality writing

Common assessments including the end of unit summative assessment:

- Narrative – on demand (pre & post)
- Narrative (2) published pieces – student choice

Teacher notes:

- This unit does not focus on the rituals and routines of WW intentionally. Build on what students know from Reader's Workshop as a model and assume transfer. It necessary teach routines or rituals specific to your classroom or 5th grade expectations.

`Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5 Writing

Unit 2: From Personal to Persuasive	Length of the Unit: 4 weeks

Purpose of the Unit:
This unit further develops student writing experiences with personal and informational essays to persuasive writing. It lays the foundation for what the Common Core demands with regards to argument writing beginning in middle school. Students develop personal and persuasive essays using strong thesis statements and logical, quality evidence. Throughout the unit students work with partners and teacher to publish two pieces.

Common Core State Standards Addressed in the unit:

- Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (W5.1)
  - Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grounded to support the writer's purpose. (a)
  - Produce logically ordered reasons that are supported by facts and details.
  - Link opinions and reasons using words, phrases, and clauses.
  - Provide a concluding statement or section related to the opinion presented.
- Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (W.5.5)
- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. (W5.10)
- Engage effectively in a range of collaborative discussions with diverse partners, building on others' ideas and expressing their own clearly. (SL5.1)
- Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence. (SL5.3)
- Demonstrate command of the conventions of standard English grammar and usage. (L5.1)
- Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling. (L5.2)

Big Ideas:	Essential Questions:
▪ Writers use many strategies to get their ideas on paper. ▪ Writers use a variety of strong evidence to support ideas.	▪ From where do writers get their ideas? ▪ How do writers elaborate on their ideas? ▪ Why do writers share their ideas?

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- Writers want to convince others to believe what they believe.

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Students will know:

- opinion writing is developed around topics and facts
- opinions and reasons support ideas presented in writing
- writers reread and edit their work to make it better

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Students will be able to:

- develop and write an opinion
- support opinion with facts and reasons
- use an organizational structure
- use linking words, phrases and clauses
- write a concluding section
- plan, write, revise and edit writing
- discuss writing with peers and adults
- summarize points

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Significant task 1: Growing Compelling Ideas in Writer's Notebook

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

**Begin this task with an on demand piece in the Opinion mode. Assess using the 6+1 trait rubric.*

Introducing Personal Essay
In significant task one, students begin developing personal (opinion) essays by examining the structure main idea/supportive examples or reasons fashion. Teachers start by co-creating 1-2 personal essays on a shared topic (e.g., I love ice cream). Students work in partnerships to complete a version of the essays started with the teacher. All modeling and student practice should occur orally first and only later on paper. Students should demonstrate oral proficiency before moving on to putting their ideas on paper.

Growing Ideas & Thesis
Following initial guided practice and partner work, students move into an invested personal essay. To show investment, they will work on this essay for about two weeks. Teachers model and provide guided practice over 3-4 days on how to grow compelling, provocative ideas in their writer's notebook. For homework, students "roam around their lives" looking to generate ideas to write about. This might require students carrying tiny notebooks. Encourage students to use social media (if allowed by parents) to share ideas they might write about outside of school. This work helps generates lots of journal entries. In a workshop, students might review three to four different entries from which they may look for trends, ideas about which they seem passionate or about which they have lots of information. After students have amassed many ideas, teachers use small group and individual conferences to begin working with students to develop a one-sentence long idea that becomes their thesis statement for an essay.

More Ways to Generate Ideas
Additional strategies teachers might model to generate ideas include listing important people and why they are important or ideas they have about them, or selecting an object and jotting down any ideas they have about that object as it relates to a topic. For example, the object might be a backpack, but homework might be the topic to which they must relate the object. These are just a few ways to support student generating ideas, but not an exhaustive list.

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Explicit lessons about the difference between writing to grow ideas and actual essay writing will help students focus on elaborating and developing provocative and compelling ideas and writing at length, rather than completing an assignment. Students receive direct instruction in using their free write to develop big ideas and precise, specific examples. Through small group and individual instruction, students are encouraged to use precise language and at varying levels, metaphors to express ideas.

Prompts for Writing

Some students will require prompts to help grow their initial ideas and elaborate. Using small groups and individual conferences provides students with modeling on how you might use a prompt in your own journal. Prompts a teacher may use include, "The thought I have about this is…" "In other words..." "That is…." This is also not an exhaustive list of prompts. Depending on the results of early whole class assessments, the whole class may benefit from explicit lessons on "thinking new things." To develop their ideas students may work with partners to see what their peers know and think about a topic. As students learn new strategies remind students that they should select strategies that work best for them and the purpose of their writing. It is not important that every student uses the same strategy but rather that they employ strategies that allow their ideas to develop and grow.

Thesis Statements

Guide most students through conferences to their thesis statement. Show students how to go back through their writing looking for something fresh and worth writing about. Teach students to study what they have written and reflect on their personal opinion that is evident through their writing about a topic. Teachers remind students that authors write to convey a message but always with the reader in mind.

Boxes and Bullets

Once students have selected a thesis/opinion statement, teach students to think of their reasons as bullet statements. Many teachers refer to this as boxes and bullets. Teachers use mini lesson instruction to create in the air for students an actual box with bullets underneath and have students practice orally filling in the blanks using shared texts or prompts. (e.g. Goldilocks should have been arrested, Elementary students should go to school earlier than HS students) Student practice developing bullet statements or reasons orally with partners efficiently and quickly about a familiar topic. Students who struggle to develop reasons may use one strategy which involves repeating the thesis statement over and over and adding because at the end of the statement to develop ideas/reasons. An additional strategy to introduce students to is, "I used to think…but now I think…" and/or "My ideas are complicated about…" Use of these prompts may be necessary for the whole class or differentiated based on need. Throughout this portion of the task it is likely that students will develop several thesis statements or revise a thesis statement and several parallel supporting ideas several times before agreeing with teacher consent/support on one to develop into an essay.

This task is concluded with students self-assessing their on demand pieces using the Grade 5 Opinion Writing Checklist and establishing goals for the remainder of the unit.

This task directly targets the following Common Core State Standards: **W.5.1, W.5.1.a., W.5.1.b., W.5.5, and W.5.10.**

Timeline: 10-12 days
Key vocabulary: compelling, provocative, personal, essay, thesis, ideas
Resources:

- Teachers College If…then lessons
- Teachers College Assessments CD
- Six Trait Crate (ideas) 5th grade
- Grade 5 Opinion Writing Checklist

Significant task 2:

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

Gathering and Collecting Evidence
In significant task 2, students begin gathering information and will conclude the task with a published piece that students again self-assess using the opinion writing checklist. This task builds on the work in significant task 1 and students utilize the thesis statements and bullets created at the end of the last task to begin essay development. To develop essays students receive instruction in how to begin gathering and collecting evidence to support their ideas (thesis statement/reasons). Students use the stories from their journals as the evidence to support their thesis statements. Teachers model by going back through their journal entries for stories to support a personal essay.

Before gathering and collecting evidence independently teachers use guided practice to walk students through the first two bullets of their essay. Students and teacher set up a physical organizational structure to collect and organize their evidence. Students start with two folders that they write their thesis statement on the outside of using bold markers or clearly indicated in some way. Students then create a smaller folder inside the folder to represent one of their bullets. Students gather facts and details to support their bullets on index cards and collecting the materials in their smaller folders. Through guided practice the teacher can model how writers constantly review evidence for its' quality.

Specific Types of Evidence
To support the work of gathering materials, teachers demonstrate for students how they can use micro stories that illustrate their ideas as evidence. Teachers provide instruction on how to angle their stories to support the ideas they want to advance. Offer opportunities for students to practice writing angled stories to become proficient at this skill. These can be worked on during free write or in their journals during independent reading. Remind students that authors use tight anecdotes with an essay so as to not overwhelm the essay. After teaching how writers use mini stories, you can begin to show another way to collect material is through lists. Teachers can show students examples of speeches like "I Have a Dream" by Dr. Martin Luther King or another student's work or the teacher's own writing. Challenge students to use one or both strategies during their writing time.

After two to three days of collecting and gathering information the teacher begins working with students to sort and organize materials and evidence. One strategy students learn is to go

through all of their materials deciding whether or not all of their evidence supports their reasons. Model for students using your own writing how you may have to revise a mini story to match the ideas in the essay. Using mid-workshop teaching points and shares, demonstrate how writers look for the best possible evidence to support their ideas. Teachers will begin to move quickly into moving evidence around into an order that makes sense to the reader. Students should physically move around the evidence using scissors and tape to arrange the ideas in a logical order. Once students begin laying out their material, they can rehearse one part with a partner using key words, specific vocabulary, and transitional words and phrases. After orally practicing how the specific ideas and transitions could go, students then begin drafting the actual body paragraphs. After students have done this for the first two paragraphs, they will go back and complete the 3rd body paragraph independently.

To complete this task teachers provide varying degrees of instruction on writing introductions and conclusions. Students are expected to publish this piece either typed or handwritten. Teachers give instruction in reading a paper section by section to ensure all the information in that section goes together. Lessons on spelling, grammar and mechanics are dictated by what's observed in student writing. End the task with a longer share allowing students to celebrate and share their work. Teachers use the conversational time to promote transference of knowledge from this one experience to what real writers do.

Timeline: 10 days
Key vocabulary: evidence, gathering, collecting, transfer, organization
Resources:

- TC from Personal to Persuasive essay writing
- TC Assessment CD
- 5th grade Opinion Writing Checklist

Significant task 3

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

In significant task 3, students move from writing personal essays to persuasive essays. Teachers use mini lesson instruction to teach students the difference between personal opinions that no one can argue with to persuasive arguments that convince someone of something. For example, "being an only child is lonely" is a personal opinion that is built around personal experiences and stories. Through direct instruction students begin to examine how persuasive essays are about our beliefs and what we believe others should believe too. Students learn to go from developing personal statement to persuasive mottos. Teachers work with students to discuss various possible ways to think about persuasive mottos. One question students can be taught to reflect upon is "how to make the world a better place." These types of prompts help move from the personal to persuasive.

As students move through the process they receive direct instruction in gathering a greater variety of evidence. Teachers use mentor texts as sources for how authors use a central metaphor, demonstrate the use of facts, and precise information to convince authors. As students work on developing their essays, they work with partners convincing them of their

arguments. Partners can examine each other's evidence rating its potential effect on a reader and linking the evidence to the reasons. Teachers may need to provide direct instruction in using the best evidence as opposed to more. Students examine evidence to ensure that it supports their reasons and thesis statement. As practice students examine current essays as well as review previously written work.

Students work to publish their persuasive essay. Teachers remind students that writers reread and revise their work. Students pretend to be their own readers and pick up the text as if they never read it before. Students publish their final pieces.

Timeline: 7 days
Key vocabulary: persuasive, personal, convince, motto, belief
Resources:

- TC from Personal to Persuasive
- Teachers College Assessments CD

Common learning experiences:

- Peer feedback and revision partnerships
- Teacher conferences in individual, differentiated writing goals
- Grammar and punctuation instruction as dictated by class need
- Small group instruction in shared learning objectives
- Use of mentor texts as exemplars of quality writing

Common assessments including the end of unit summative assessment:

- Opinion essay – on demand (pre & post) (W1, W10)
- Published pieces (2) (W1, W5, W10)

Teacher notes:

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Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5 Writing

Unit: Informational Writing – Unit 3	Length of the Unit: 4 weeks

Purpose of the Unit:
This unit allows students to explore informational writing through feature articles. Students practice thinking about topics they know a lot about and building that knowledge with research. This information is organized in multiple ways and written as an article. Revision and editing are a focus as students learn to use multiple sources of information to build and elaborate on ideas. Students end the unit through the practical application of science learning in a writing published piece.

Common Core State Standards Addressed in the unit:

- Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (W5.2)
  - Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting, illustrations, and multimedia when useful to aiding comprehension.
  - Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
  - Link ideas within and across categories of information using words, phrases, and clauses.
  - Use precise language and domain-specific vocabulary to inform about or explain the topic.
  - Provide a concluding statement or section related to the information or explanation presented.
- Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (W.5.5)
- Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (W.5.7)
- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. (W5.10)

Big Ideas:	Essential Questions:
▪ Writers write about things they know really well. ▪ Writers use background knowledge and research to build on their ideas. ▪ Writers continually draft and revise. ▪ Writers consider their audience.	▪ How do writers select what to write about? ▪ How do writers elaborate on their ideas? ▪ How do writers get their point across clearly? ▪ How do writers make their writing purposeful?

Students will know:	Students will be able to:
▪ how to define a feature article ▪ domain-specific vocabulary ▪ organized pieces add clarity ▪ how to take notes and paraphrase	▪ write informative and explanatory pieces ▪ convey information and ideas clearly ▪ introduce a topic clearly ▪ provide a general observation and focus ▪ group related information logically ▪ link ideas within and across categories ▪ use precise language ▪ use domain specific vocabulary ▪ provide concluding statement ▪ conduct short research projects

Significant task 1: Generating Ideas

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

In significant task 1 students need to live like authors of feature articles – carefully studying the subjects they know about for possible topics. If students utilize tiny writer's notebooks, they jot down ideas in that notebook for later reference. Teachers remind students of strategies they have previously learned to generate topics. Remind students to think about the people and places that are important to them; this is a starting place for students to generate topics about which they are experts. Students receive small group and individualized instruction as support for those who require additional work generating topics.

Students work with partners and small groups to test ideas and topics to see if they are "worth" a feature article. Students teach each other in their small groups what they know about the topic to see if it "works." Students use strategies like list across your fingers, using gestures, drama, re-enactment, drawings, and diagrams as ways to "tell" their feature articles. The teacher models, using the "fishbowl" strategy, how students can teach their peers about their topic to see if it "works." Teachers use both topics that are not successful and ones that do "work." Teachers demonstrate for students that when teaching about a topic their "explaining" voice is different than their storytelling voice – model both.

Students begin to select a topic based on peer feedback. Teachers demonstrate immediately planning and revising their articles. The teacher uses a personal example as a model but one about which 5th graders can easily participate. Possible topics include New England States, Connecticut, stringed instruments or another common topics of interest about which students have both background knowledge but will require some small amount of research to add details for elaboration. The best topics will come from the writing community.

Using a variety of resources, teachers model for students credible sources from which they can conduct research about their topic. Depending on the topic and the amount of background knowledge details students possess, whole class or small group lessons may be necessary in note-taking and/or paraphrasing. Teach students sketching, boxes and bullets, summarizing, flow charts, t-charts, etc. when appropriate.

Timeline: 5-7 days
Key vocabulary: feature articles, experts, credible
Resources:

- Teachers College If…then lessons
- Teachers College Assessments CD
- Six Trait Crate (organization) 5th grade

Significant task 2:

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

As students collect additional key details for their feature articles they continue to plan, draft, and revise potential topics. Students receive direct instruction in organizing their subtopics. Using the class model, teachers demonstrate for students how writers organize information into categories and within categories. Teachers model for students how writers use headings and subheadings in their articles to make the organization visible to the reader.

Through direct instruction the teacher uses mentor texts for a variety of elaboration strategies students can use to build on their ideas. Students can be taught to use their strategies intentionally in the revision process. One elaboration strategy that may be new to 5th graders is the embedded anecdotes. Teachers demonstrate that anecdotes used in feature articles are teaching anecdotes. One example can found in the mentor text, *The Rock We Eat: Salt* embeds a narrative about a king's daughter who asked that a meal be prepared without salt to illustrate the importance of this precious mineral. Additional strategies include using examples and comparisons as elaboration strategies. Teachers continue to use mentor texts to provide students with examples of how to use linking words to connect ideas logically within a paragraph. An example of sophisticated use of linking words can be found in *Votes for Women* by Ann Rossi. In this text linking words are used to show the relationship between two ideas within the paragraph.

Teachers provide direct instruction in using research to support their background knowledge. Students gather relevant details to support their thinking and when necessary receive instruction in note-taking and paraphrasing and utilizing domain-specific vocabulary. Through direct instruction students learn how to embed definitions and are reminded to double check the spelling of technical vocabulary.

As students begin finishing their drafts teachers begin introducing the importance of audience. Teachers provide direct instruction in how writers think about their audience in specific ways and determine the message they, the author, wants to send. Model providing an angle or focus for the piece that would engage your audience. Remind students to use engaging or interesting facts or details that they may have gathered from their research or already know based on their background knowledge. Study mentor texts for the author's angle. Examine the use of adjectives again as a sign for the tone the author takes and a strategy to use as both writers and readers. Through direct instruction use mentor texts to examine how authors use the introduction and conclusions of their pieces to include their thoughts. Students return to their draft and examine their introductions and conclusions for angle or message. Revise for word

choice or other areas that would enhance clarity.

Timeline: 5-7 days
Key vocabulary: subtopics, categories, angle, focus, introduction, conclusion
Resources:

- TC from Informative writing If…Then Curriculum
- TC Assessment CD
- Six Trait Crate (word choice) 5th grade
- The Rock We Eat: Salt
- Votes For Women

Significant task 3

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by 45 minutes of independent writing during which time student partnerships, individual and small group writing occurs. Workshop concludes with a 5 minute share.

This task begins with the post on demand informative essay. This is used as both a summative assessment and formative assessment for whole class, small group and individualized instruction.

In significant task 3 students focus on organizing their information logically. The teacher provides direct instruction in logical order such as general to precise, precise to general or chronologically. Model revising class writing using these various strategies. The teacher informs students that writing informational texts sets their readers up to be experts. Teachers provide direct instruction in reading or rereading texts like it's the first time. Additional instruction in text features is provided through studying various mentor texts including student work when available.

Through direct instruction teachers define revision versus editing. Revision is the process of enhancing the actual writing while editing deals more with checking for conventions. Teachers elicit various editing strategies and share strategies that would benefit student writing based on previous class instruction. Small group and individual lessons on revision and conventions are provided based on classroom data. One new editing strategy to introduce 5th graders to is called from the bottom up. Students read the last sentence of the paragraph and then the sentence above that. Reading the paragraph out of order allows the writer to correct errors that the brain would fix if read as written in order.

At this point in the task the teacher administers an additional on demand task in the informational mode. Use information gathered from this assessment to conclude this task in small groups and individual conferences.

To conclude the task students are ask to reflect on the light and sound science unit they are currently studying or have just completed in reading. Students begin to think about a feature article they could write based on what they've learned in the reading unit on light and sound. Though direct instruction the teacher walks students back though the process. Lessons included generating topics about which they are experts, picking a topic and subtopics, organizing

information and elaborating with research and additional information. These lessons are modified based on individual needs and additional lessons may be required. Through direct instruction students work with partners, sharing and testing ideas and considering the audience the writer is trying to reach. The feature article about light and sound is a typed published piece.

Timeline: 5-7 days
Key vocabulary: revision, editing, conventions
Resources:

- Teachers College Informational writing 5th grade (If…then curriculum)
- Teachers College Assessments CD
- Six Trait Crate (revision & conventions) 5th grade

Common learning experiences:

- Peer feedback and revision partnerships
- Teacher conferences in individual, differentiated writing goals
- Grammar and punctuation instruction as dictated by class need
- Small group instruction in shared learning objectives
- Use of mentor texts as exemplars of quality writing

Common assessments including the end of unit summative assessment:

- Informational text – on demand (Pre and post done at the beginning of significant task 3)
- Light and Sound feature article

Teacher notes:

- A week before this unit begins you may want to encourage students to begin thinking about topics about which they are experts. These can be homework assignments or an assignment in general.
- Notice the post for this unit is done at the beginning of task 3. It is used as a summative and formative assessment.

Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5

Purpose of the Course: 5th grade writing expands on the skills and strategies as writers students have developed across all writing modes. Students begin to develop a more comprehensive understanding of themselves as writers, and develop in more sophisticated ways. Genres studied during the fifth grade year include narrative, personal essay, persuasive essay, memoir, informative/explanatory, short-research projects, and opinion writing.	
Name of the Unit: Unit 4 Memoir	Length of the unit: 5 weeks
Purpose of the Unit: This unit is an opportunity for students to work deeply and closely together to help each other author memoirs. As fifth graders, they are on the cusp of becoming teenagers. This unit gives students a chance to define themselves, a chance to author life stories that they can take with them as they leave the safety of elementary school. The CCSS suggest that students should be able to discern the central ideas and themes in a text. The memoir unit will ask them to also do this work in the texts of their lives and find new meanings. Teachers and students will find that the memoir unit draws on both narrative and essay writing skills. For that reason, it is purposely placed to come after those units.	
Common Core State Standards Addressed in the unit: W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. W. 5.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. W.5.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) W.5.5 With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. W.5.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks,	

purposes, and audiences.

W.6.1.d Establish and maintain a formal style

RL.5.2 Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.

RL.5.9 Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics

RL.5.10 By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently.

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.5.3 Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.

L.5.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

L.5.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

L.5.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.

Big Ideas:	Essential Questions:
1. memoir uses elements of personal narrative and personal essay 2. the form of memoir is not necessarily preset. Writers choose from among a variety of text structures to create their very own design	1. What is memoir and how is it similar to and different from personal narrative and personal essay? 2. What text structures do memoir writers use when they want to write a message?

3. writers of memoir draw meaning from the relationships and experiences in their own lives and are inspired by the work of other writers 4. writers revise and edit their work using specific strategies. They improve on and strengthen drafts by cycling through the writing process more than once	3. Where do memoir writers get ideas and support for their writing? 4. How can writers rehearse for and draft memoirs? 5. What are different ways memoir writers plan, revise and edit to help improve their writing?
Students will know: ▪ descriptive details enhance writing ▪ clear sequencing/organization is important in memoir writing ▪ transitional words and phrases ▪ conclusions are important in memoir writing ▪ writers cycle through the writing process more than once	Students will be able to: ▪ write 1-2 memoirs using both narrative and essay stuctures in one piece ▪ use clear organization of the ideas and support in their memoir writing ▪ use transitional words and phrases ▪ write a conclusion related to the ideas and detailed support of their memoir ▪ improve drafts using the revising and editing process
Significant task 1: Collecting Entries and Idea-Based Writing ***Writers continue to use their notebooks in this significant task to research their lives. Support students in transferring past experiences in their notebooks to their current work in fifth grade***. *Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by independent writing, partner conferences, teacher conferences, and is concluded with a 5 minute share.* In significant task one, students will study the qualities of memoir and discover that this genre is a hybrid kind of writing. Students will read through and discuss several examples of memoir noticing the structures the writer used. Memoir draws heavily on what students already know about writing personal narratives, personal essays and persuasive essays. Students will notice that memoir writers sometimes have an idea to share and might begin by explaining the idea as	

in an essay. Students will also notice that some memoir writers might use a personal narrative to show his or her idea is true. Students will then study their own writing territories that they visit often and begin to interpret or grow big ideas about their own lives. Students will think about complicated questions such as: "What matters most to me? What kind of person am I and What is one of the big things I want to say about the whole of my life?" They will use their notebooks to write both "big" and "small" writing about large ideas or theories (big) and then zooming in (small) to write about one time when that idea was true. Teaching charts from the boxes and bullets work in personal and persuasive essay can be utilized to support students in this work. Students collect entries, read through them and then choose one as a "seed idea." Student will draw on their work in text-based research from prior units in that they will need to take a research stance. Toward the end of this significant task, students will explore what it means to write with depth and refer to a class chart of strategies as they continue to refine their pieces.

This task directly targets the following Common Core State Standards:

W.5.1, W.5.3, W.5.4, W.5.5, W.5.10, RL.5.2, RL.5.9, RL.5.10, SL.5.1, SL.5.3, L.5.1, L.5.2, L.5.3

Timeline: 6-7days

Key vocabulary: memoir, personal narrative, personal essay, text structures, hybrid, themes, issues, writing with depth

Resources:

- Writer's Notebooks (will be introduced in Significant task 1 and everyday thereafter)
- Teachers College Reading and Writing Project Units of Study – Grade 5 - From Essay and Narrative to Memoir
- "Eleven" by Sandra Cisneros
- "Quietly Struggling" by Kelly Boland Hohne

Significant task 2: Studying Memoir structures and Choosing One to Suit Our Needs

Each day's lesson should follow the Writer's Workshop format. There should be a brief mini lesson including a clear teaching point, modeling, and guided practice. This is followed by independent writing, partner conferences, teacher conferences, and is concluded with a 5 minute

share.

In significant task two, students will learn about three different forms memoir can take (narrative with reflection, essay-like structure, and list-like structure). They will reflect on the idea they want to put forth and then choose the form that best suits their idea. Students spend a day or so rehearsing and then flash-draft. Revision work will focus on ways to strengthen both the expository and narrative portions of their writing. Teachers will model making meaningful decisions and show students how to move from an idea they have to a bit of storytelling to support their idea. Students will continue to improve their writing skills focusing on storytelling that is quick, to the point and clearly supports the ideas put forth.

Teachers will guide students in the use of the opinion/argument writing checklist and the narrative writing checklist because memoir writing bridges both of those types of writing. Some innovative students may be able to meld these two checklists into one that becomes their own. Students will also use an editing checklist

This task directly targets the following Common Core State Standards:

W.5.2, W.5.3, W.6.1.d, RL.5.1, RL.5.2, RL.5.3, RL.5.5, SL.5.1, L.5.1, L.5.2, L.5.3

Timeline: 6-7 days

Key vocabulary: memoir, personal narrative, personal essay, text structures, themes, issues, writing with depth, finding patterns in writing

Resources:

- Writer's Notebooks (will be introduced in Significant task 1 and everyday thereafter)
- Teachers College Reading and Writing Project Units of Study – Grade 5 - From Essay and Narrative to Memoir
- *Invention of Solitude* by Paul Auster
- *The House on Mango Street*

Significant task 3: Writing a Second Memoir

If students have finished a first memoir, they will return to their notebooks, researching their lives again and collect new ideas and moments. Students will be taught to study themselves as they would characters in a book, uncovering ideas and theories that can lead to new memoir ideas. They will choose a new seed for a second memoir or choose to try the same topic from their first memoir and write it again using different evidence or a different structure. Students will again flash-draft this new memoir and then begin the revising and editing process.Teachers and students will reread mentor texts comparing and contrasting what authors do with what they are trying in their own pieces. This second time around, students will be invited to consider language, symbolism, structural choices and perspective. As in other units, students continue to ask themselves; "What do I like that this author has done?" and "How could I use a similar technique in my own writing?"

This task directly targets the following Common Core State Standards:

W.5.3, W.5.4, W.5.5, RL.5.1, RL.5.2, RL.5.3, RL.5.10, SL.5.1, L.5.1, L.5.2, L.5.3

Timeline: 7-8 days

Key vocabulary: memoir, personal narrative, personal essay, text structures, themes, issues, writing with depth, finding patterns in writing, growing theories about ourselves

Resources:

- Writer's Notebooks (will be introduced in Significant task 1 and everyday thereafter)
- Teachers College Reading and Writing Project Units of Study – Grade 5 - From Essay and Narrative to Memoir
- *Invention of Solitude* by Paul Auster
- *The House on Mango Street*
- Copies of final drafts of student memoirs, Session 19, pages 157-162 From Essay and Narrative to Memoir

Common learning experiences:

- Peer feedback and revision partnerships
- Teacher conferences in individual, differentiated writing goals
- Grammar and punctuation instruction as dictated by class need
- Small group instruction in shared learning objectives
- Use of mentor texts as exemplars of quality writing

Common assessments including the end of unit summative assessment:

- Begin the unit with an on demand writing assessment. The prompt could begin "Think of a topic or issue that you know or care about, an issue around which you have strong feeling. Tomorrow, you will have forty-five minutes to write an opinion or argument text in which you will write your opinion or claim and tell reasons why you feel that way. You will draw on everything you know about essays, persuasive letters and reviews. You may find and bring information from a book or another outside source and bring that with you. You will have 45 minutes to write this piece so you will need to plan, draft, revise and edit in one sitting." Teachers may use a chart with the following information to help children.
  In your writing, make sure you:

- Write an introduction
- State your opinion or claim
- Give reasons and evidence
- Organize your writing
- Acknowledge counterclaims
- Use transition words
- Write a conclusion

As students write this piece, teachers do not coach into what they are doing.

Teacher notes:

- Memoir text to support this unit includes:

  Quietly Struggling by Kelly Boland Hohne (see CD-ROM)

  "Last Kiss," from Ralph Fletcher's memoir, Marshfield Dreams

  "Mr. Entwhistle," from Jean Little's memoir Little by Little

  "Everything Will Be Okay" by James Howe and other stories from Amy Erlich's *When I Was Your Age: Original Stories about Growing Up*

  "Eleven" by Sandra Cisneros, from *Women Hollering Creek*

- The majority of students should write two memoirs. They may be on two different topics or they may be two different versions of the same memoir.

Windsor Public Schools
Curriculum Map for the Intermediate Level
Grade 5 Writing

Unit 5: **Unit Research-Based Argument Essay**	Length of the Unit: 5 weeks

Purpose of the Unit:
Students will exercise their right to free speech and voice their opinion. They will be presented with an issue, and after careful research and evidence, take a stand, and write a persuasive argument essay to present to a panel of the school community. Students are learning to go from persuasive and personal essay to an argument essay that is grounded in research. In this unit, they will also have the opportunity to choose their own issue to research and write a second argument essay. They will learn writing skills of a researcher and an essayist, reading and writing simultaneously. They will note similarities and differences in the point of view they represent. Their reasons will be supported by facts and details. Students will draw on essay skills that they already know.

Common Core State Standards Addressed in the unit:

- Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (RI. 5.1)
- Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. (RI.5.2)
- Draw in information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (RI.5.7)
- Analyze multiple accounts of the same event or topic, noting similarities and differences in multiple accounts of the same event or topic. (RI 5.6)
- Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which points. (RI 5.8)
- Integrate several texts. (RI 5.9)
- Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (W.5.1)
- Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. (W.5.3)
- Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade specific expectations for writing types are defined in standards 1-3). (W.5.4)
- With guidance and support from peers and adults, develop and strengthen writing as needed by planning revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 5 here). (W.5.5)
- With some guidance and support from adults, use technology, including the internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting. (W.5.6)

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- Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (W.5.7)
- Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources. (W.5.8)
- Apply grade 5 Reading standards to informational texts e.g., “explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s)”). (W.5.9.b)
- Write routinely over extended time frames (time for research, reflection, and revision) and a shorter time frame (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. (W.5.10)
- Engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on grade 5 topics and texts, building on other’ ideas and expressing their own clearly. (SL.5.1)
- Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence. (SL 5.3)
- Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at understandable pace. (SL 5.4)
- Demonstrate command of the conventions of Standard English grammar and usage when writing or speaking. (L 5.1)
- Use underlining, quotation marks, or italics to indicate titles of works. (L 5.2d)
- Use knowledge of language and its conventions when writing speaking, reading, or listening. (L 5.3)

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<tr><td>Big Ideas:
1. It is not enough for students to have an opinion about a topic. They will need to support it with researched evidence.</td><td>Essential Questions:
As argument writers, how can we structure our writing so that it includes claims that are supported by reasons that are backed by evidence?</td></tr>
<tr><td>Students will know:

▪ How to study and emulate the work of mentor writers.
▪ Which note taking element works best for them
▪ How to write argument essays</td><td>Students will be able to:
▪ write opinion pieces on topics, supporting a point of view with reasons and information.

▪ argue logically: analyze texts, weigh evidence and consider logical reasoning.

▪ consider audience appeal and counterargument.</td></tr>
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	▪ plan and rehearse their writing: collect, sort, and select from an abundance of specific information. ▪ assess their writing using checklists. ▪ draw on a host of revision and editing strategies as well as knowledge of good writing to improve their drafts. ▪ meet publishing deadlines. ▪ help each other within a community of writers. ▪ research a topic for evidence about both sides of an issue. ▪ learn to take a stance and defend it with research.

Significant Task 1:

Big Idea: We can take a stance on an issue after reading pros and cons and defend it with researched based evidence.

Essential Question: How will we develop a solid argument by researching and collecting evidence to both sides of an issue?

In creating a real life drama to motivate students, the class will be presented with a letter from the principal as to whether chocolate milk should be served in schools. This is an issue that is relevant to them. As they initially begin to take sides, and share their opinions, teach them that these need to be based on more than gut reactions, that their opinions should come from consideration of evidence, which means suspending judgment. Students can read together, discuss the information and then push each other's thinking through debate and whole class conversation. Students will report on this topic to a panel of cafeteria workers, administration and other students.

Students will collect research of both sides of this issue, postponing a quick, premature conclusion until actual evidence is understood. Students need to know the subject matter very well in order to write about it. They will have to have a knowledge base regarding the topic about which they write. This unit goes with nonfiction projects because it requires close reading, analyzing two or more texts on the same topic in order to write and speak about the subject knowledgeably.

Students will need the time to go back to the same article and read and reread it as nonfiction articles are full of information. Both sides of an issue are studied in order for students to make an informed decision. They will interact with both print and digital texts, gathering information that they can use in their essays. This work should not overwhelm the writing that they do. Writing should be at the forefront. They will decide which side they will take. Then students will begin to plan and write their own arguments. This will lead to their persuasive letters to the principal on this topic. Students will be taught how to analyze their data, how to interpret data, and make decisions about what to quote. Demonstrate how to gather information (in their notebooks) from a video to take down pertinent notes. Pausing the video or re-watching parts of it to take in all the facts it has to offer on the topic is one way to do this. Note taking in the form of a T-Chart (pro and con) will help with organizing ideas. Students go off and read articles on the topic. Students will speak to their partner about the side they have chosen.

The class can split into two teams and debate the issue. They name their claim, make their position clear, and support it with reasons and evidence. Students do not use their personal life over research. They cite the evidence they found. They listen to a point the other team is making, jot it down quickly, and when one has evidence to talk back to those points, do it. After the debate, has them go back and write in their notebooks about the experience.

Personal preferences have no place here. They will write their "flash draft" argument letter, a rough draft of their argument. Do this whether you think your students are ready or not. They have written persuasive essays and literary essays before. These letters will be considered approximations. During this first round of argument writing, students get a sense of the whole process. We need time for repeated opportunities for students to write essay arguments in this unit! Flash drafts provide you with a window of what students can do. Notes alone can't show you this. You are looking for a clear and convincing line of thinking. This gives you time to help those who need it, instead of waiting until the end of the unit. Students are transitioning from persuasive to argument writing. The flash draft will let you see if they have learned this.

Timeline: 2 weeks.

Vocabulary: solid argument, premature conclusion, perspectives, take a stance, suspending judgment, researched based evidence, perspectives

Resources: Both digital and print on the topic. "Sugar Overload" YouTube (as students jot information in their notebooks,

This task directly targets the following Common Core State Standards: W.5.1, W 5.4, W.5.7, W.5.8, W 5.10, RI.5.1, RI.5.2, RI.5.7

- Teachers College
- Teachers College Assessments

Significant Task 2:
The students send their persuasive letters to the principal. The principal's response is for the class to do more research on the subject and look at their written argument essays again, becoming self assured in their evidence to present to panels of administrators, parents and cafeteria workers.

Big Idea: Students will check how strong their evidence is to be able to present their argument before a panel.

Essential Question: How can I make my stance strong enough to convince a panel?

Students decide on which note-taking system works best for them, and look at their research more critically. They are more knowledgeable now, and are able to notice an author's perspective better. They will look over their data, evaluate it and decide which is strong enough to support their stance. They will make their argument more effective. They will decide how to use the evidence they have found, and perhaps more evidence. They will decide between quoting and paraphrasing. They will check to see if they have drawn information from various sources and integrate them into their writing. Students will need to think ahead and predict possible counterclaims their panel may have, and how they will counter them. Students will think about the perspectives of their audience by thinking about their audience roles or jobs they hold and what evidence would mean the most to convince them and back up their stance. To help them imagine other sides of an argument, they may try some of these prompts:

- "Some people might say…But you can also argue…"
- "On the one hand, there is research to show…such as…"
- "On the other hand…"
- "Even though I'm not sure I agree with _____, some good points they make ar…"
- "A compromise or middle ground might be…"
- "What if…"

Students need to learn logically ordered reasons. They may think about which of their boxes and bullets should come first, second, and so forth.

Timeline: 1 week

Vocabulary: audience perspectives, counterclaims

Resources: Articles, both digital and print

This task directly targets the following Common Core State Standards: W.5.3, W.5.6, RI.5.7, W 5.1c, W 5.9, SL.5.1, SL.5.3, SL.5.4, L.5.1, L.5.2.d, L.5.3

Significant Task 3

Students may now pick an issue of their choice and write an argument essay.

The focus will be to address the counterclaim. This will give students experience in counterclaim for sixth grade. Subjects could be off shoots of their first argument essay, like whether school lunches are nutritious or not. This essay could be tied to the content area. Students think of what they want to change in the world, or something they want to see people think differently about. This essay will have the strongest writing. They research it; finding many sources of evidence, conduct interviews and surveys of their own. They will have a deadline and learn to plan accordingly. They will apply all they have learned from the first experience with argument writing. Evidence will not be general, but accurately representing data in order to make a strong case. Boxes and bullets are used here. The first bullets are to state their reasons and their evidence. The third bullet addresses the opposing side, the counterargument. Leave the charts out from the first argument essay. This chart may help:

Claim

- Reason 1
- Reason 2
- Counterclaim

Considering counterclaim, students ask “What is the other side saying? What are the reasons?” Address the most critical points the other side makes asking, “Does this feel critical? Is this a major point?”

Sentence starters for the counterclaim to consider:

- While this is true, so too is…
- Many would say…but…
- My opponents believe…because…however…

Counterclaims will improve the argument but don’t let them take away from building a strong case. The opinion continuum may help students self evaluate their essays, making them strong. They will need to develop a bibliography of resources they used.

This task directly targets the following Common Core State Standards: W.5.1, W 5.4, W.5.7, W.5.8, W 5.10, RI.5.1, RI.5.2, RI.5.7, SL.5.1, SL.5.3, SL.5.4, L.5.1, L.5.2.d, L.5.3

Timeline: 2 weeks

Key vocabulary: counterclaim
Resources: Digital and print

Common Learning Experiences

- Peer feedback and revision partnerships
- Teacher conferences in individual, differentiated writing goals
- Grammar and punctuation instruction as dictated by class need
- Small group instruction in shared learning objectives
- Use of mentor texts as exemplars of quality writing

Common assessments including the end of unit summative assessment:

- Begin the unit with an on demand writing assessment.
- Use the 6+1 Traits Rubrics to assess
- Post on demand assessment

- Published piece and presentation before a panel

Teacher notes: